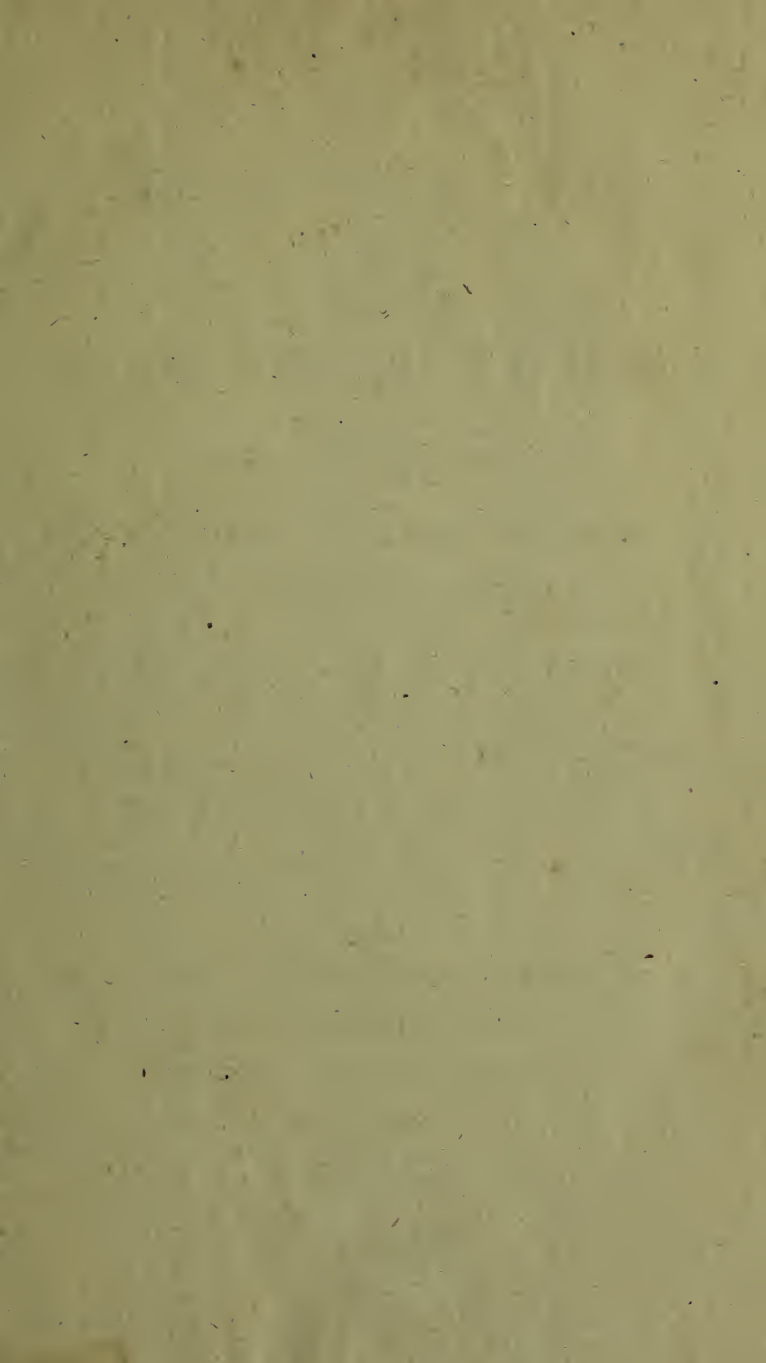
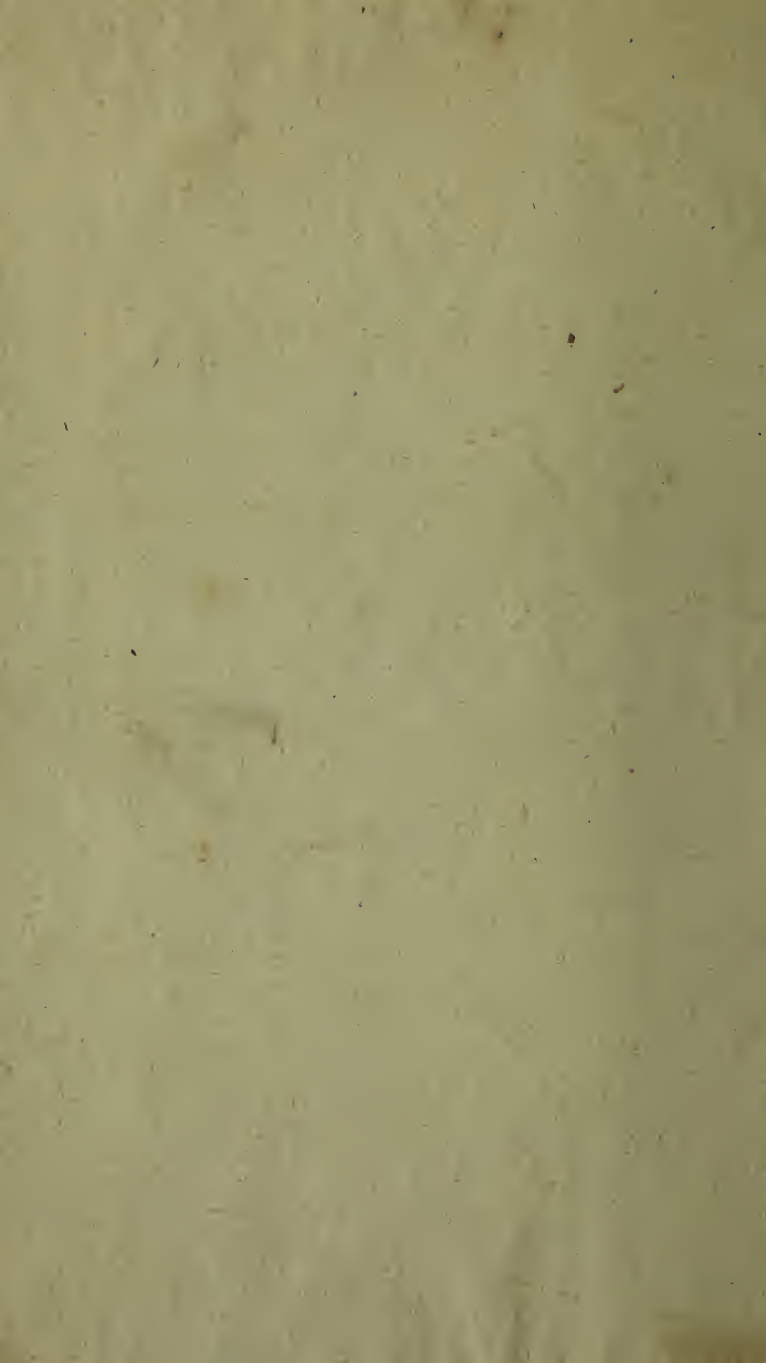


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A N
E S S A Y
O N
A G R I C U L T U R E,

WITH A VIEW TO INFORM
GENTLEMEN OF LANDED PROPERTY,
WHETHER THEIR ESTATES ARE MANAGED
TO THE GREATEST ADVANTAGE.

BY THOMAS STONE.

L Y N N:

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T O

Sir HARBORD HARBORD BART.

M. P. for *NORWICH*.

SIR,

PERMIT me to offer to you the following Treatise on AGRICULTURE. However defective the Composition may appear in Point of Merit, if the Hints, it contains, should afford any useful Information to Proprietors or Occupiers of Land, it will answer the highest Expectations of its Author. Every Attempt to elucidate a Subject upon which the primary Resources of Society depend, or to point out any practicable Modes of Improvement in that Art, will, I trust, meet with

with a favourable Reception from the Public.

The Benignity of YOUR Character, the Extent of YOUR Judgment, united with a thorough Knowledge of the Subject, as well as my own Intentions, and the Respect, I have long wished to pay to YOUR Name, have induced me to solicit the Honour of YOUR Protection.

In addressing you, SIR, on this Occasion, it is far from my Disposition to adopt the Language of Adulation. The distinguished Trust, which YOUR Country has long and deservedly reposed in YOUR Hands, adds a Lustre to YOUR Name far superior to the most elaborate Panegyric. Yet
 permit

permit me to join in the heartfelt Tribute, you daily receive from YOUR Constituents: by *whose Solicitations only*, you were reluctantly prevailed upon to become their Representative. An invariable and patriotic Regard, always displayed in promoting the most important Interests of YOUR *Electors*, laid a Claim to YOUR future Services; and we enjoy the Happiness of seeing one of the first Commercial and Manufacturing Cities in the Kingdom represented with *Integrity*.

The particular Attention you have shewn to the most useful Science in this Country, gives me Reason to hope, that you will be pleased candidly to receive this little Work into YOUR Patronage.

What-

Whatever Inaccuracies may occur in it, must be imputed to my Distance from the Press; by which I was prevented from an Opportunity of making the necessary Corrections: Nor should I have presumed to lay it before you in its Infant State, had it not been for the flattering Solicitations of some of my most respectable Friends, to whom I had promised the Publication of it several Months ago.

I have the HONOUR to be

with the GREATEST RESPECT,

S I R,

your most obedient

BEDFORD, JULY }
the 30th. 1785. }

humble Servant,

THOMAS STONE.

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E R R A T A.

A few Errors having crept into the Press, occasioned by the Author not having an opportunity to revise it himself; the candid Reader is requested to correct them, as they occur in the several pages referred to.

Page 10 line 9 dele *and*, page 19 line 1 for *in* read *on*, page 36 line 15 dele *have*, page 41 line 18 for *upon* read *up in*, page 133 line 4 for *be* read *the*, page 230 line 19 for *tenants* read *tenant's*.

INTRODUCTION.

AFTER the numerous Essays which have been published on AGRICULTURE, by many it may possibly be thought an exhausted subject ; and therefore any further attempt to inform Gentlemen of Landed Property, whether their Estates are managed to the greatest advantage, or not, may be deemed to arise from motives of a self-interested nature, or from an inordi-

B

nate

nate desire of appearing in print. The Author's design is only to relate a few plain facts, from which, Gentlemen may perhaps draw such inferences, as may, if reduced to practice, be attended with no inconsiderable improvement and profit. His pretensions to a work of this weight and importance are founded upon many years' experience in the management of large tracts of land, in different parts of England, both as a farmer, and land-steward; having observed a multiplicity of abuses, and various instances of
 mis-

misconduct, he is desirous of making public those remedies, which have been suggested to him by subsequent reflection. He is well ascertained, that the rent paid by many tenants, instead of being a compensation for the yearly product of the land, is absolutely a diminution of so much money from the fee simple, or real value of the estate. Such land-holders may be aptly compared to a man, who not availing himself of the emoluments derived from putting his cash out to interest, annually deducts a considerable sum from

the principal. The inclosure of open fields has been often followed by many evils in consequence of an injudicious allotment of the several divisions : those evils have been increased by letting them to improper tenants ; tenants, who from incapacity, or want of money, have been tempted for present advantage, to pursue a system of Agriculture in the end ruinous ; the result of which bad management is, that large tracts of lands have fallen into the proprietor's hands, after they have been mangled by self-interested

or

or injudicious tenants. This has proceeded in a great degree, from the want of judgment in the stewards or agents employed in such concerns. A man so employed, may have been a very good domestic, and very faithful in his receipts and payments ; he may have nothing but the interest of his employer at heart, and yet may be a very bad land steward ; I mean with regard to his skill in drawing a fair line between landlord and tenant, as the common guardian of the permanent interests of both parties. This can only be

done by those who understand the particular interests of both, with a just view to their situations ; therefore it may be asserted with truth, that no man is capable of judging rightly of the condition of a farm, and the abilities of a farmer, but a person well qualified in the same profession, or a better farmer. The rule may be extended to other professions, with equal justice ; there is no magic in the name of a land-surveyor, no *secret* or *mystery* in the business he follows, though so much pains have been taken by many of them to impose

impose such notions on the world. There is no difference in the flavour between good and bad land to my palate, though many reputable surveyors will say the contrary.

The knowledge of Agriculture, both in theory and practice, ought to be the chief accomplishments of a land-surveyor ; or abilities the same as those, which constitute a good land steward. It is necessary before a surveyor can decide upon the value of a farm, consisting chiefly of arable
land,

land, that he should examine whether a mode of husbandry best suited to the soil is adopted; whether there are any advantages to be derived from the bowels of the earth, with respect to clay, marle, sand, limestone, or chalk, &c. The covenants the tenant holds by, and how far it is in the tenant's power to impoverish the land, without breach of covenants before the end of the term; whether the stock of every kind on such farm is the best that might be had, and whether the quantity is sufficient, or whether the tenant suffers

suffers from being over-stocked, &c.

Gentlemen of landed property, will here judge for themselves, whether Persons unacquainted with practical Husbandry ought to be trusted, in a business of this consequence; upon which not only the property, and comfort of landlord and tenant, but the bread of families so frequently depend. It is true that appearances will at times deceive men of the best judgment, who have only an opportunity of taking
one

one view of an estate, or seeing it only at one season of the year; there are instances of arable land, that notwithstanding a shew of fertility, will produce only a small portion of grain, and that of an inferior quality. Pasture land which at one season of the year will appear to be impregnated with the finest and best natural grasses, will in a dry spring, if the soil be compact, or in the neighbourhood of a rock, become too hard, and arid for vegetation, and the coldness of clay, in a wet season, will greatly retard the progress of the
 grass.

grafs. Indeed some pasture land may, in a warm spring, wear the most flattering face, without having strength to make the production quick, strong, and perpetual; therefore when a surveyor has not an opportunity of seeing land at different seasons of the year, he should be careful in examining the soil which lies under the surface.

Gentlemen of landed property have frequently complained to me, that they have been considerable losers by farming, or occupying

cupying large parts of their estates; the reasons for which are very obvious, viz. That there are very few instances where they have kept more of their land, than was sufficient for the use of their families, or necessary for their amusement; so that when extensive tracts of land have fallen into their own hands, after a bad tenant has mangled and impoverished it, by successive cropping, and perseverance in a bad system of husbandry, it is no wonder that they should complain of the heavy expences and length of time before
such

such land can be brought into order again, even where the most trusty and skilful servants are employed.

Though such expences are common to farmers, when they hire land in such condition, and hence with other circumstances in which land may be improved, the necessity of leases is derived. It would be equally improper in a Gentleman to say, that he would grant all his estate upon leases, as to say he would not grant any of it so : there are but few farmers capable of improving

proving a farm essentially, who will embark their property without a lease. The cause is plain; such improvements as may be practicable, are generally attended with heavy expences; and though a tenant may rely upon the honor of the landlord of whom he hires his farm, there is always a probability, that before he has reimbursed himself, the estate may fall into the possession of another proprietor, who may form a wrong estimation of the merits of the occupier. On the other hand, in the case of land that is in the highest state

state of cultivation already, such as ancient meadow and pasture, or land laying near to a gentleman's mansion, leases are unnecessary ; and granting them would be tying a gentleman's hands from pursuing any ornaments, or alterations; that may take his fancy ; or fix a disagreeable neighbour upon him for a term of years.

It may now be said with truth, that before the great advance of rents in the present age, leases were not so necessary as at this time. The land being lett at less
than

than its real value, there was not that incitement to industry, and improvements, which has been so necessary of late years. Farmers were then content to sleep in ignorance, or when waking to follow the track chalked out by their fore-fathers without looking either to the right, or left. The advance of rents brought a spur to industry and a degree of thirst for knowledge ; and by learning how best to pursue their own interest, they have also learnt the readiest means to abuse that of their Landlords, unless properly restrained. Hence
it

it is become absolutely requisite, that a fair line, by means of leases with covenants properly adapted to the soil and situation, should be drawn between landlord and tenant, for the preservation of their mutual safety, and *that* harmony which ought ever to subsist between them: It being a truth acknowledged by every person well versed in Agriculture, that a difference of five years purchase is often made in the value of an estate by a good or bad occupier, and in particular instances a great deal more ; therefore a

plain inference may now be drawn,
viz. That it requires a greater de-
 x degree of skill and management to
 preserve an estate at its improved
 rent, than it did to raise it.

A N

E S S A Y, &c.

OF SOILS AND THEIR IMPROVEMENTS.

THE generality of Soils consist
T either of clay, marle, sand,
gravel, or chalk, and the re-
mains of putrified vegetables. The
soil arising chiefly from frequent pu-
trefactions of vegetables is commonly
called the staple; but I mean to dis-
tinguish it by the appellation of natural
soil, being more or less common to all
land upon which vegetables have been

produced. The different proportions and mixtures of clay, marle, sand, chalk, gravel, and the remains of putrified vegetables, comprehend all the soils in general cultivation; and these mixtures, as made by nature or art, may with some propriety be described as follows: An equal mixture of sand, clay, or marle, with a small portion of gravel, or small pebbles, with natural soil, is properly understood to be mixed soil land; and as the proportion of clay decreases, and the sand predominates, it is light loam, but of different degrees. But when no appearance of the adhesive part, which we call clay or marle, remains, or is to be found, the sand is very sharp, and consequently cuts and

and subtilizes the particles of the natural soil, the quantity of which is always proportioned to the quantity of vegetables produced upon the land. On the other hand, when the sand decreases in the mixture, and the clay predominates, by parity of reasoning, we distinguish the different degrees, by the appellation of strong, or very strong loam, until it approximates to, or becomes clay.

An extended experience and the publications of many ingenious gentlemen have clearly evinced, that a sandy soil is improved in the most effectual manner by a mixture of marle and clay. Of this truth the county of *Norfolk* is an instance; where large tracts of sandy country

country have been fertilized with ease, because nature there has not hidden her treasures in the bowels of the earth, the marle lying frequently within six inches of the surface. The best kind of marle, or clay is that, which is possessed of a heavy, soapy quality when wet, and dissolves after exposure to frost. The colour of marle, or clay has no connection with their other properties. Here it may not be improper to remark, that some farmers, especially those of *Norfolk*, have pushed the practice of manuring their land with marle or clay, to an improper length: too liberal use has been made of it; and where fifty or sixty loads per acre would have had the best effect, eighty or a hundred have been of great disservice.

The

The method of improving sand with clay, or marle in my opinion is as follows, viz. The land for which this species of manure is intended, should be laid down a year (two years would be better, when it has been long in a state of tillage) with rye-grass; the texture of which will form a kind of turf earlier than any other seed upon poor land. When the soil consists of a light sand, the burthen of marle, or clay should be light in proportion; for the good effect is always found to proceed from a skilful mixture, and combination of the two opposite bodies. Therefore if too large a quantity of marle or clay is laid upon sand, it will, instead of incorporating therewith, sink beneath it from its weight,

weight, beyond the reach of the plough, and leave the land as barren as it was before. In this case, if fifty or sixty loads of marle, or clay, were to be laid upon an acre, instead of the common quantity of eighty, or an hundred, farmers would find a good account in it. It would incorporate much better, and might be repeated in small quantities every fifteen or twenty years. When I say marle or clay, I do not mean, that they are to be used in equal quantities, if they are not of equal weight. Marle is generally understood to be a lighter body; therefore sixty loads of marle may be only equivalent to forty of clay. The discretion of the occupier must weigh this matter.

When

When marle, or clay, after having been spread on the land as regularly as possible, does not dissolve readily with the first frosts, opportunities should be taken of rolling and harrowing it, in order to break and separate the clods that still remain: and as soon as the whole mass has sunk beneath the surface, the land may be broken up and converted to tillage. In the improvement of commons or heath land, consisting of sand, or light loam, the marle or clay should be laid upon the turf, one year at least, previous to its being broken up.

I have seen a large quantity of land, where vegetation has been stopped or

D

injured

injured for many years, in consequence of a farmer's having laid too large a quantity of clay upon a light loam: the soil in its nature being too adhesive to admit of the heavy body of clay to sink through it, out of the reach of the plough. He by this changed the soil from one extreme to another; it became so very adhesive, that the water was retained upon the surface or near it, and rendered difficult or impossible to be drained. Cropping of every kind was thus chilled, and impoverished.

Another improvement on sandy land may be added by means of lime; which, though not so permanent as clay or marle, is no indifferent substitute

stitute where they cannot be obtained, and would be found of infinite advantage to land, upon which they have been previously used. To many parts of the county of *Norfolk* (for instance) where clay or marle have been applied before, it would bring on a fresh fermentation, or dissolve the stubborn and adhesive particles of earth. Lime is used with great success in many parts of *Shropshire*, and *Staffordshire*, upon light loams, and often repeated, at the rate of from two to three chaldrons per acre, upon fallows that are preparing for turnips. Though it is to be remarked, that the *Shropshire* farmers neglect the more solid and lasting improvements of marle or clay upon their sand and loams, which

might be laid on with great facility. In that country they are generally to be found a little below the surface of the earth; and the expence of proper marling, which would last at least fifteen years in the land with the same effect, if not with a better than liming, which they repeat commonly every six years, and would not exceed that of one coat of lime.

Notwithstanding the advantages derived from marle or clay, every farmer ought to endeavour to procure and preserve all the dung and manure arising from his cropping, and stock of cattle in his fold-yards, which will always be found of infinite benefit; most particularly in the cultivation of turnips or artificial grasses.

By

By the improvement made upon sandy land by means of clay or marle, it becomes altered to the condition of light loam; therefore I shall treat of the cultivation of

LIGHT LOAM.

IF such land is very light, it will be necessary to divide the whole quantity into seven parts, as the following, viz.

3. Parts of the seven laid down with rye-grafs,

1. Part of seven broken up, (of the oldest rye-grafs layer) drilled or sowed with pease

1. Part of seven sowed or drilled with wheat after pease

1. Part, fallow and turnips.

1. Part,

1. Part, sowed with barley and
grafs seeds after turnips.

Notwithstanding I have mentioned rye-grafs for the layer, I do not mean that it should be uniformly adhered to. It might be better to sow a part of the land intended to lay two, or three years with St. Foin, if a trial has been made, and it is found suitable to the soil; another part with rye-grafs, trefoil, and clover: so that clover and trefoil will be one fourth each. The clover will do well the first year, afterwards the rye-grafs and trefoil will predominate, and become more luxuriant, by receiving a fresh nourishment from the decay of the clover roots. By this means, if a seven years' course
of

of husbandry is pursued, the artificial grasses may be so varied, that the land will produce the *same*, only once in twenty one years. When a six years' course of husbandry is pursued, (which varies from the seven years' course only by the land being divided into six parts, and having only two parts laid down with feeds instead of three) the exact repetition will be only every eighteen years. It is to be remarked, that when rye-grass and clover are sowed together, and both are produced at one time in a luxuriant state, they will not be mowed to advantage, as the rye-grass will be ripe for mowing much sooner than the clover: so that the one or the other must in a great measure

measure be given up ; tho' the ryegrass, which will always be forwarder than other feeds, may be checked by being grazed early in the spring, even when intended for mowing. But it is the best way to graze all artificial grasses, the first year, the land is laid down ; by which means the feeds will gain strength, (if the land is not overstocked with sheep, or horses) and it will in some degree acquire a fresh feed. Upon a loam, which may be stronger, than the before mentioned course of husbandry is properly adapted to, and which will acquire as strong a turf in two years, as a lighter loam will in three, the following course of husbandry may be pursued, dividing all the arable land into six parts, viz.

2. Parts

2. Parts of six, rye-grafs or other approved feeds;

1. Part, pease drilled, or sowed upon the oldest layer of feeds, plowed up in the spring about *February* or *March*.

1. Part, wheat upon pea stubble.

1. Part fallow, and turnips;

1. Part, barley and artificial grafs-feeds after turnips.

The course of husbandry before mentioned is practised with great success in many parts of *Norfolk*; the rye-grafs affords a very clean, warm lair for cattle, on which turnips may be thrown; it being a common practice to strew fresh turnips every day for fattening of cattle and sheep.

Indeed it is generally the practice to provide two, or more separate parts, or fields of rye-grass layer near each other, for the purpose of strewing turnips thereon. There is a forward set of cattle and sheep, which has fresh turnips and are shifted every day, and a set of store cattle and sheep, which follow them in succession to eat up the refuse turnips, and broken pieces left by the forward sort. The store, or last mentioned sort are brought up early every afternoon into a straw yard, where they remain all night. As soon as they are brought up, fresh turnips are strewed upon the ground they came out of, for the feeding cattle the following day ; after which the feeding

ing cattle are brought up into a warm yard, foddered, and then turned out again to fresh turnips early in the mornings, and the store sort turned into the ground the feeding cattle were in the preceeding day, to eat the refuse &c.

Besides which two sorts of cattle, a *Norfolk* farmer generally stall-feeds a quantity of oxen, in proportion to the size of his farm; or else provides a warm yard well enclosed with faggots, and boarded cribs placed about it for his forwardest cattle, or a set forwarder than those before mentioned, to feed them on turnips and barley straw, or any coarse fodder with the turnips. In which yard or near it, he

provides a hovel or conveniency to deposit his store turnips, so that the person who attends the cattle, as well as their provender, may be sheltered from wet and cold, during the business of topping, tailing and scraping the turnips; which tops and tails are carried out as back carriage to the store cattle. Another good end is answered in having a stock of turnips always provided in such a manner, that there is no immediate necessity for drawing turnips in bad weather for a daily supply, which otherwise would be the case. Another precaution is generally taken, viz. to avail themselves of good dry weather, when the turnips will draw clean; and as many as are necessary for a fortnight's consumption

at

at least, are drawn and laid in heaps, in the respective fields where they grew, ready for use.

Many farmers draw their whole crop of turnips off the land where they grow; others draw two lands, and leave one; or two thirds of the whole quantity are drawn off, and the remainder is left for sheep and cattle in the spring.

The farm is not impoverished by drawing turnips from it, as many persons have suggested; because the produce is expended upon some part or other of it in an uniform manner; so that the land, which has the turnips drawn off it, is repaid again, when
laid

laid down with rye-grass or other artificial grasses, by having the produce of another field of turnips thrown upon it.

The sort of cattle the *Norfolk* farmers generally provide are *Galloway Scots*, which species is esteemed the best, and most profitable feeders upon turnips. They generally purchase them at three several times, or in as many lots. The first lot is purchased in *October*, which are kept upon a kind of refuse food all winter, and in the succeeding spring, they are put into the rye-grass or other artificial grasses; which first lot is carried into fresh pastures, after-grasses, &c. to the warm straw yard to lie there to be
foddered

foddered and made ready for market. They are by this method generally very fat by the *Christmas* following. But as a *Norfolk* farmer by means of turnips seldom wants provender for his cattle, he can wait for the best markets, while the cattle continue to improve. The second lot is generally purchased about Midsummer, or when the forward cattle are shifted or gone to eddishe, and follows them in their pastures, taking some of the stubbles, till the time of foddering them with turnips in the fields, as before described; after which they are pushed forward in rye-grass, and made very fat by the next *Midsummer*. The third lot is purchased about the same time, and for the same uses as the first,

fol-

following the second sort to eat up their refuse.

It is needless in this place to say any thing about sheep, as it must be obvious to any person the least acquainted with grazing, that sheep which have a clean warm lair, and fresh turnips thrown to them every day, must feed faster than those which are inclosed in pens.

There is a scaly stone mixed with light loam in several parts of *England*, with a kind of rock within a few inches of the surface. This land is in several instances very ill appropriated to pasture: for tho' the herbage is generally of a very good sort,
and

and of a very sweet bite for sheep, yet its duration in a luxuriant state is seldom more than two or three months in the spring, it being subject to be parched or dried up with the least dry weather. Therefore it is best to apply the plough to such land, with the same cultivation as other light loams, with this observance—that less clay, or marle is necessary to be used upon this kind of * loam, than where there is no such stone; because the clay or marle may fasten the stones, and render the cultivation difficult: and the stones will in some
F degree,

* St. Foin is likely to suit this sort of land; but it may not be considered so proper as other feeds which come quicker to perfection, where the object of a farmer may be to break up his artificial grasses every two or three years.

degree, when the land is in tillage, answer the intention of clay or marle, by shading and keeping the land cool, whereby the moisture is retained, and the land rendered highly fruitful.



MIXED SOIL, AND ITS IMPROVEMENTS.

THIS soil is adapted to the production of every plant, and vegetable, that can be produced in our climate. It is the most profitable land to occupy, as it may be worked in any season, being never affected in a great degree by either drought or wet. It retains as much moisture in all seasons, as is necessary for the production of the vegetables with which it is impregnated, and resists both extreme wet and drought, which would be prejudicial. With due attention in the occupier to keep this kind of land clean, and restore to it the manure which is derived from its own product, it can-

not be exhausted with a succession of crops. It will bear a frequent repetition of the following course of husbandry,

Fallow and turnips,

Barley and clover,

Clover,

Wheat.

Nevertheless it will always be good husbandry to keep off the quick succession of crops, from every sort of land. Therefore a course of husbandry varied from the former, (as the following) may be advisable.

Year

Viz. 1 Fallow and turnips,

2 Barley and clover, or other seeds

3 Clover,

4 Pease

4 Pease,
 5 Wheat ;
 and the following, viz.

Year

- 1 Fallow and turnips,
- 2 Barley, trefoil, clover, and rye-grafs,
- 3 Trefoil, clover, and rye-grafs,
- 4 Trefoil, clover, and rye-grafs,
- 5 Pease,
- 6 Wheat.

Crops varied in this manner will always tend to the advantage of the occupier.

This land stands in need of little repair. But as the quantity of manure laid thereon from its own product may tend to lighten the soil, once in
 twenty

twenty or thirty years, a light coat of clay or marle may be found of infinite service to brace the loose particles of earth together, at the rate of thirty or forty loads to an acre. A mixtion, composed of dung, maiden earth, mud, and a small quantity of lime, is a great improvement when laid upon this sort of land, as well as all other, and may be easily obtained in most situations. The maiden earth found under hedges, or the emptyings of ditches is more or less to be procured upon every farm.

This sort of land being adapted for every production, if the soil be deep, which is generally the case, when laid down with white *Dutch* clover, and the best natural grasses, it makes excellent pasture.

OF STRONG LOAM.

This soil is best adapted for perpetual pasture; especially where the natural soil is of a sufficient depth, and the land does not crack in dry weather, which usually happens, when some sorts of clay in the mixture are too predominant; and so much so, that it is dangerous to ride or walk over it in very dry weather, on account of the fissures, which are frequently more than a yard in depth. This I have often observed in *Huntingdonshire* and *Northamptonshire*, where the propensity of the land to crack, in a great measure, severs and destroys the roots of the finer natural grasses, which the penetration of the sun afterwards

wards enters, dries away, and destroys. Therefore soil of this kind is best adapted for the plough; and it may be held as a general rule, that whatever land is subject to crack and fly to pieces with the common dryness of summer, is never to be made good pasture. Such land being appropriated to the plough, the grain and artificial grasses, which are generally of a quicker and higher growth than natural grass, will shade the land in the spring, before the sun has power to penetrate, and the produce will thereby be preserved.

I recommend that such land, wherever there is a necessity for preserving it in a state of pasture, be under-
flocked

stocked at all times, (especially with sheep and horses) whilst the heat is extreme. A grazier will find his advantage in attending to this advice: therefore we must ever judge from their promptitude to crack, whether strong loams are adapted for pasture or not; or whether it will be found most profitable to continue or convert them into arable, with the cultivation of artificial grasses.

Great care must be taken in the cultivation of strong loams, that the land may never grow foul with weeds; it being more difficult to extirpate weeds from them, than from any lighter soil, on account of their adhesive quality, which renders it very diffi-

cult to separate the particles of earth in extracting the roots of weeds : especially those of that worst of enemies to ploughed land, called by some farmers spear grafs, by others twitch grafs, or *Scotch* grafs. It is so universally known to farmers, that its pernicious qualities need not be particularly described : I shall only observe, that its roots are full of short joints, any of which being left in a moist state, in the smallest clod of earth, will produce a fresh stock of the enemy.

This land is to be improved by any lighter body, when perfectly clean ; such as sand, maiden earth, filth, the emptying of ditches, or a mixtion made of the foregoing, with dung and
a small

a small quantity of lime, laid stratum super stratum, and turned over two or three months before it is used.

The modes of husbandry to be practised are in some measure the same as those upon land of a mixed soil. Turnips may be cultivated upon this sort of land, and brought to the same perfection as upon lighter soil : and upon the system of drawing and conveying them to a piece of dry ground for consumption, may be used to as great advantage.

The objections usually made by those, who are wedded to old customs, and pretend that the turnips cannot be eaten except upon the land on

which they grow, and that carting upon it would be highly injurious, have no weight with me, when I had provided a dry layer to throw them upon, and a broad bottomed sledge or broad wheeled cart for conveying them. And if these modes of conveyance were found to be prejudicial to the land, from the treading of horses, I would carry the turnips in large skeps or baskets to the side of the field, or into a track, ready to be conveyed away in carts: always observing to draw the turnips ridge by ridge, or land by land; and as soon as any one land of turnips was drawn off, to send a plough backwards and forwards to clean the furrows out, for the purpose of draining the land.

If

If it were practicable to eat the turnips upon a strong loam, by penning cattle and sheep upon them, without waste to the turnips or prejudice to the cattle, the land might be greatly injured by their treading, on account of its tenacious quality.

A farmer, who occupies a tract of land, composed in some places of strong, and in others of light loam, might drop the plan of cultivating turnips upon the strong. But having no light loam, he should even cultivate them upon the strong.

Coleseed is now in great use upon this sort of land, in countries where the cultivation and use of turnips are
not

not well understood, or reduced to practice, with a view to avoid the bad effect which is supposed to follow the permitting turnips to be eaten on the land. For indeed it is a plant less liable to be injured by the trampling of cattle, than turnips. It is also a very strong food, and a quick feeder of sheep, but of no other cattle, and cannot be put in competition with turnips, in point of quantity, weight, or value. Besides turnips are alike useful for both sheep, and cattle, not excepting the horse.

I have have had experience enough to convince me, that whatever land will produce coleseed, will produce turnips of a greater value; therefore
the

the latter ought to be preferred, except in the fens, where the land in many parts during winter is subject to be under water, sometimes to the depth of several inches without any extraordinary floods: and where the land at all times requires treading, whenever sheep, or cattle can be got upon it, and is dry enough for them to lie on, as I shall hereafter shew. The courses of husbandry to be used upon strong loams are for the first course, the following.

Year

- 1 Fallow and turnips,
- 2 Barley and clover,
- 3 Clover,
- 4 Beans,
- 5 Wheat;

Second

Second course

1. Fallow and turnips,
2. Barley and feeds,
3. Rye-grass, trefoil and clover,
4. Rye-grass, trefoil and clover,
5. Beans,
6. Wheat;

Third course

Year

1. Fallow and turnips,
2. Barley and clover
3. Clover,
4. Pease,
5. Wheat;

Or any other varied courses of husbandry with meliorating crops interwoven, to keep off successive crops of corn, and the quick repetitions of the same grain or feeds.

OF CLAYS.

The colour and appearances of arable clays have nothing to do with their vegetative qualities, except in particular districts, where I have seen clays of different colours in one and the same field, and even where their tendency has appeared to be opposite; the one very dissoluble by air and frost, the other quite impenetrable, and yet both equally fruitful, or the contrary. There is no knowing such land but by its fruit; and where there is not an opportunity of contemplating the modes of husbandry practised, or to be practised upon clays, and the produce for a series of years, regard must then be had to such appearances as can be come at.

The thickness of the natural soil or staple is to be the principal consideration. If it is found thin, it is a plain indication that the land is unfriendly to vegetation; otherwise, the remains of putrified vegetables would be more abundant. Regard must be had in some measure to situation; upon the declivity of hills, the natural soil or staple may have been in some degree washed away, and wasted. Great care must be taken upon this land not to plough below the natural soil, staple, or that part of the clay, which is mixed with the natural soil; this would bring up a cold, unfriendly associate not easily to be removed. Therefore when clays are found to be so very destitute of
 staple

staple or natural soil, unless a farmer has abundance of manure, and but little land, I would recommend him to touch this neighbour as lightly as possible; no great advantage could at any rate be derived from it, and much mischief might ensue. Above all things this land must be kept clear of the lodgment of water: and tho' it is seldom found to be much troubled with springs, they must be carefully drained, where it is,

The superficial draining must be here attended to with great care; for wherever water lodges for any length of time, no grain will grow; and in case land is found with an even surface, ploughing it upon small ridges, from four to six, eight

and ten furrows, with due attention to the fall of the water, so that drains may be made to carry it clear off the land, the object of preservation to the crop, from too much water, may be easily and advantageously effected. But unfortunately upon most of the clays in *England*, and and loams also, (*Suffolk* and *Norfolk* only excepted) antient husbandry has placed the remedy out of the power of man. The lands are very often to be found ridged up from six to twelve yards wide, and the ridges are in many instances a yard or two higher, than the horizontal plane of the furrows; by which, all the best of the soil, has from time to time been ploughed up to the ridges of the lands, or washed down into the furrows, and
con-

conveyed away ; so that not more than half the land is worth occupying, viz. from the ridges half way down to the furrow. The remainder is so chilled with water, and so robbed of manure, from its being washed into the furrows, that the grain produced thereon is of little or no value. Water will always fall, where there is the greatest declivity, and that is generally from the ridge in a straight or oblique direction into the neighbouring furrow.

Besides this inconvenience in open fields, where property is mixed, a farmer is sometimes obliged to wait till his neighbour begins to ditch ; which necessary work, if he delays for
for

for a short time, the common superficial outfalls are obstructed, and the water often impounded in extreme wet, even up to the ridges of the lands, when sowed with grain. The chief evil is the form of the lands, which cannot be altered without first throwing the ridges down into the furrows, and reducing the land into a level state ; which must by all means be avoided, as it would be burying the best soil, and bringing the worst upon the surface. Nor indeed can it with propriety, or at all, be done by degrees : for in that case the first step to be taken would be to plough the old furrows in, and fill them up, and thereby stop the water, and bring on a general stagnation.

There-

Therefore as the form of it cannot be altered without inevitable prejudice, the best modes of managing it in its present state must be adopted.

Here I cannot help remarking the absurdity of custom in this particular. That in countries where this sort of land generally prevails, and there happens to be particular spots in those countries, or even large districts of a light loam or sand, which would be most benefited by being in a flat state, it is ridged up exactly similar to the clay. In the county of *Suffolk*, especially that part of it which is very strong loam or clay, and stands much in need of draining, the farmers very judiciously plough the lands
upon

upon four furrow stiches or ridges, by which the ground is effectually drained, and the loss, which is occasioned by the innumerable furrows, is amply compensated by the preservation of the remainder of the land. But surely it is unnecessary to use the same mode of ploughing upon very light loam, or sand, which is generally practised in the same county.

There is but very little clay land adapted for pasture : the test by which we may judge of it, is the same with that of strong loams. If it is a sort that will not crack and fly to pieces in dry weather, but on the other hand has a good depth of soil, it makes

excellent pasture; but otherwise, is of little value when applied to that purpose, and where it is in that state, it ought to be converted to tillage. Due regard should be had to keeping it clean and dry, and to avoiding an uninterrupted succession of crops, as much as possible.

Upon thin-skinned, or *thin-stapled* clays, I do not recommend the culture of turnips further than a trial; therefore if they are found to answer, a farmer would do well to pursue it, nor should he be discouraged with the ill success of one trial. The courses of husbandry may be similar to those used on strong loams, as well as the manure and improvements.

OF CHALKY LAND.

THE culture and improvement of this sort of land must ever depend upon its temperature. When it consists of a brittle, light nature, a coat of marle, or a light coat of clay will be found of infinite use : but on the other hand, if it be of an unctuous soft quality, it is generally very fruitful, and stands in need of but little assistance from foreign aid. This sort of chalk may be esteemed a great improvement, when laid upon clays and strong loams : but as it is not so frequently met with, its great utility has not been so universally experienced as marle or clay. The methods of husbandry and improvements must be
 simi-

similar to those practised upon loams, with this observation—that chalky land is friendly to the production of St. Foin in the highest perfection, and therefore this matter should be materially attended to.



OF GRAVELLY LAND.

THIS land differs from light loam in some very essential points, altho' the methods of husbandry must be the same. Marle or clay must be used very sparingly upon it; and when applied should be mixed with maiden earth, dung, and lime, if it can be obtained. Clay or marle laid on improperly in too large quantities would do mischief; because the first effect would be binding the stones together, and forming a mass as hard as a road. This sort of land is generally considered to lose the good effects of dung, or manure, sooner than any other: the reason of which is evident; viz. the sharpness of gravel cuts and subtilize:

manur^r

*The Heat of the Sun from the Loam has been
the cause of the loss of the manure*

manure, which in consequence thereof is with precipitation washed down below the staple, or otherwise blown, and wasted away. Therefore a mixtion, as before described, is the greatest improvement, this sort of land is capable of.



ON THE APPLICATION OF SOIL TO
ITS RIGHT USE.

ALL endeavours at improvement in agriculture, all the volumes, both journals and travels, that have been written upon the subject, have pretended to the accomplishment of this end, without ever arriving at the point. Their ill success I impute to the following reasons; first, that most of these publications have been deficient in that candor, which ought to have accompanied them; and secondly, many of them are destitute of matter to render them either instructive or entertaining. I think, I am justified in making these assertions, when the press has of late years been burthened
with

with publications of this kind, without producing remedies adequate to the evils complained of.

Gentlemen, who have been intent upon reforming and correcting the abuses practised on their respective estates, have had too much promised them in immediate advantages on their setting out, and in consequence of disappointment have slackened in the ardor of their pursuits, and declined a second trial. Improvement and reformation are not to be brought about immediately. A setting out upon true principles, with a spirit of perseverance, will work miracles. Most of the gentlemen possessing this truly laudable spirit of improvement (that I
have

have had the honour to converse with) have complained, that theory and practice frequently vary. However there is no doubt, but that in many instances the persons employed in the execution of improvements in farming, were mistaken in the nature and properties of the soil. This is not so much to be wondered at, when I have seen frequent instances of the most intelligent farmers, being in a distant country mistaken, in attempting the application of soil to its right use. Nor will such mistakes appear extraordinary, when every measurer of land sets up for a land surveyor; and in an age, when the best recommendation of a man for business, is his having most contributed to the pleasures of his employers.

Pro-

Professional men are undoubtedly the best judges of men in their own profession, but are often destitute of candor to deliver their opinions truly ; therefore silent merit frequently vegetates, and dies in the soil which produced it.

Gentlemen of landed property are very competent judges, whether many years' application to the theory and practice of agriculture in different countries, with a knowledge of the particular interests of landlord and tenant, united with abilities capable of comparing the different circumstances of the whole, are not a material part of the necessary requisites to qualify a man for the office of land steward. The best judgment that can be formed

of the nature, property, and value of land, is to be made by examining well its present state and produce; an investigation of the management that it has received in time past from the occupier, and a comparison of *that* with the best methods and arts which have been adopted upon soil of a similar appearance: because it is an impossibility for any man, but the occupier of such land, or a person, who has watched it through its several stages of management and produce, to determine its nature decisively. Whoever wholly rejects, or depends upon the intelligence he can get from the tenants thereof, and in the neighbourhood of an estate which he may be called upon to survey, will be very like-

likely to err. His judgment must be formed from comparing and compounding the whole together.

The general product of the soil is more certain to determine its value, than prognostics picked out of the whole science of botany. There is no mystery in discovering the value of land. Sound experience and good sense will do more than all the land tasting, which has been practised: and it is much to be regretted, that gentlemen should have been so long imposed upon, and the land-holders in many instances distressed, and oppressed by men, who pretend to ascertain the value of land by the arts of mystery.

The

The situation and the general product, as to quantity, quality, and value, are the first considerations in pasture land. The quantity and quality of the stock it carries both in wet and dry seasons ; whether it is subject to be drowned in the former, or burnt in the latter, and whether the stock is of a sort best adapted to the soil. In mowed grounds the quantity and quality of the hay ought to be a principal consideration ; also what weeds are produced upon the land, and if they are noxious to cattle. The value of pasture land may in a great measure be determined by the healthy condition of the stock it carries : where weeds are not too predominant upon it, let them be mowed or spudded in seasons
when

when they are in the most sappy state, for at those times they are most easily checked, if not destroyed. The last consideration is, whether such pasture ground be in its most profitable state, or ought to be broken up and converted into tillage. Tillage might be advisable, at least for a few years, if the land was found too much overrun with weeds, or covered with ant-hills and hassocks of sour unprofitable grass; which upon neglected pasture land of thin-skinned clay most frequently happens.

It is necessary to observe all the productions of land, the bad as well as the good symptoms, in order to form an adequate idea of its value ;
both

both ought to be weighed with care, and compared together. If weeds are the chief produce of the soil, the quickest mode of extirpating them is to be preferred, and that will be found to be by ploughing and summer fallowing.

It is not a new remark, that most plants, whether weeds, or not, flourish best upon good land, and the luxuriant state of plants or otherwise is the best criterion of the soil. Whoever pretends to a mysterious power of judging the value of land from observing only the appearances of a few weeds, which may accidentally spring up amongst the general product of the ground, must intend rather to con-

found

found than inform others. We need not have recourse to the strength of black and white thorns to inform us that land is good, when its general produce is found to be so; or to mallows, or groundfell in a vigorous state, as indications that it is naturally rich. There is no doubt of finding *that* out by more profitable symptoms: Nor to birch, broom, or juniper to inform us of poor land, when its general produce will declare its poverty.

A particular attention to such prognostics might be of some little use, where no better could be obtained, such as in the uncultivated parts of *America* or elsewhere; but they must not be depended upon in *England*,
 where

where there is but a small part of the land uncultivated. But may not the properties of uncultivated land be ascertained by a similiar soil in its vicinity, which is cultivated? It is not necessary, that a man should be a complete botanist, in order to form a competent judgement of the value of land.

An ingenious author recommends attention to the grasses and weeds to be found on the borders and skirts of land in order to ascertain its temper. But it is well known, that it has been a custom time immemorial for farmers and graziers (before the late improvements) to carry their fodder into the fields, and lay it under hedges and
trees

trees for their young or store cattle in particular seasons, to shelter them from bad weather, (when feeding): therefore, why may not such places have been feeded by hay fetched ten miles from the place. Hence I conclude, that too much dependance must not be laid upon such particular plants, as characterizing the soil which produced them. Where land has at any time been cultivated itself, or is situated near cultivated grounds, transplantation may have brought them; the same kind of transplantation in some degree may have taken place in the wilds of *America*, or deserts of *Arabia*, in the progress of armies and caravans.

It is the general product of land which must determine its value every

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where,

where, with proper allowances for its deficiencies. Whatever is esteemed wholesome, and inviting to cattle, cannot be accounted a weed; and therefore the value of land must be computed by the comparative value of its produce. Notwithstanding the seeming ease with which soil might be applied to its right use, how is it to be accounted for, that large quantities of neglected pasture land, as well inclosed, as open, still remain in the most unprofitable state, being covered with ant-hills, occupying at least two thirds of its surface. The sides of which are productive of a sedgy, four, unprofitable grass, which no cattle will touch at any season.

Who-

Whoever suffers land to remain in the state I have described; foregoes his own interest, his tenant's and the community's at large. The reason of which neglect in my opinion is principally this—Gentlemen of landed property are, as at all times they ought to be, desirous of preserving the value of their estates, as near as possible; and they generally think, this end cannot be so well attained, as by preserving them in a state of pasture. By these means they are less liable to be reduced in value by ignorant or selfish tenants who generally, when left to pursue their own course of management, plough and sow away for the sake of immediate profit, and thereby reduce the value of the land.

On this account, gentlemen are often determined to prefer the least of what appears to them as evils without a suitable remedy. Here the experienced steward should be called in, the faithful guardian entrusted with the interests of both landlord and tenant, and possessing abilities to draw the line equitably between them for their mutual, permanent benefit. When it might be explained, that pasture land derived no value from being antient, unless increasing years had preserved or increased its fertility: and when the contrary was found to be the case, the sooner an improvement was suggested, the sooner the interests of both would be forwarded. Where a farmer possesses a quantity of poor grazing

grazing land, circumstanced like that I have been describing, both poor and sedgey, no other plan can be devised with greater advantages than that of draining, if springs of water are the cause; but if not, I advise that a part of it be broken up, and converted to tillage every year, beginning with the worst first; such as a sixth, fifth, or fourth of the whole according to circumstances, ploughing up ant-hills and hafts.

Here a steward, who is a judge of the nature and properties of the soil to be broken up, with the best methods of husbandry that can be adopted, will construct covenants, and make agreements for the benefit of landlord and tenant,

tenant, with a view always directed to the preservation of the value of the estate: and if it can be done without sacrificing the tenant's interest, to its improvement also; which in cases of this kind may be done, if the work is applied to with suitable judgment.

Upon such land as I have already mentioned, no improvement can be effected without ploughing it up. I have seen several instances, where this sort of land has been altered by laying or throwing the ant-hills; that is, by paring off the superficial parts of the hills, throwing out the contents about the land, and then laying down such parings upon the basis of the hills. And this plan would doubtless

answer

answer upon land of a good quality, where the contents of the ant-hills are found to be of a tolerable good soil, and the surface a tolerable turf; but upon clay of a poor nature, which is most subject to ants, it will not answer. If a view of poor clay land is taken after this alteration, we shall find that instead of an improvement, the land has received a material injury by this mode of management. The contents of the ant-hills which are thus thrown about the land injure it, because it is a sour, sterile clay, and altogether unfriendly to vegetation. If we examine the miserable turf on the surface of the hills, we shall find it little else than a sedgy, sour grass, which no cattle will touch; and was it otherwise, it would
be

be attended with no good effect to lay it as turf upon the base of such hills, which can be no better foil, but worse than the contents which I have already described.

In answer to this, it might sound plausible in theory to say, that by dunging such land after this alteration, and sowing good grass seeds, or making a mixtion of dung, lime, and natural foil, it might be greatly improved; but the practical husbandman would soon clearly demonstrate the utter impossibility of obtaining a quantity of dung adequate to the purpose of effecting it materially. If he possessed any ploughed land, together with such pasture ground, as before described,

scribed, it would be found, that the dung and compost arising from thence would be hardly equal to the maintaining it in tolerable condition, if a regular system of antient husbandry was pursued: or, unless the vegetable and animal manure produced upon the land can be carried to a high degree by the cultivation of turnips and clover. Old ploughed land produces little more manure, (without great exertion in the occupier) than is necessary for its own immediate support; therefore stands in need of a return for what it gives in the same proportion: and, when by any means that return is made with liberality, it abounds in gratitude.

There are but few situations that will admit of foreign aid, that is, of purchasing manure without paying an enormous price for it, and fetching it from a great distance, which is generally more expence than a return will answer. Where it is otherwise, the opportunity should be embraced without hesitation. An immense quantity of dung will produce a powerful effect upon any land, and would doubtless be desirable, even upon the soil I have mentioned. But there is not one situation in a thousand, that will at any rate produce a quantity of manure sufficient to improve a considerable portion or extent of this sort of land, and therefore other methods must be contrived

Another

Another improvement of this kind of coarse, sour pasture land, has been suggested by cutting up the hills and carting them on heaps, then suffering the heaps to lay in a rotting state, and incorporating them in a mixtion with dung and lime; which would make a valuable dressing for any land. And, when those heaps had got into a proper state for spreading, to sow the land over with grass seeds, and then to set on the manure in liberal quantities. This would be a very quick and easy method of improving this sort of land, where dung could be obtained, if it would do the business effectually; though I have seen instances upon strong clays, where this method has been adopted, and the occupier been

obliged a considerable time afterwards, to collect together the golt or clay, and cart it off; it being in a baked, indissoluble state like bricks, occasioned by the heat of the dung when in the heap, which agreed with its own natural stubbornness. Therefore, where this plan is adopted upon strong golt clay, it would be the best method to pare off the turf or grassy covering of the hills, to lay them on heaps, and to carry the inside of the hills totally off the land, as an enemy.

How far this improvement might answer in any case, must be determined by the price of the labour, and the ease with which dung could be obtained. I fear the expence would
be

be greater than the advantages, and therefore could only be adopted on small portions of land, where the continuance in a state of pasture was a great object. An obstacle to this mode of improving, is having the bases of the ant-hills to combat with, which occupying, in many cases, two thirds of the land, and in most instances a considerable part thereof, would be but sparingly improved by this superficial dressing. If grass seeds were sowed upon such poor land, there is a strong probability against their ever growing, and if at all, they must be produced in a languid, unprofitable state, and unlikely to come to perfection——therefore I should reject this plan.

Another

Another has been recommended, and in a variety of instances carried into execution, against the interest of both landlord and tenant, considered with regard to their permanent advantage. It is a plan, which instead of remedying the evil complained of, viz. the poorness and thinness of the soil, must evidently tend to increase it; I mean paring and burning—which has idleness for its parent, and poverty for its offspring. The effect produced by paring and burning is, that by means of the ashes three or four successive good crops are produced. Afterwards the strength of the ashes being exhausted, and the natural soil reduced in its thickness, the land is greatly diminished in value, and cannot

cannot be brought about again, even to the state it was in before, without extraordinary labour and expence.

Having thus far considered the different methods practised in the alteration of antient pasture land in the state described, and having presumed to recommend draining, if necessary, and ploughing up such land, or converting it into tillage, my next consideration shall be the best method of effecting this design.

The land intended to be ploughed should be broken up in the latter part of the year, so that it may have the benefit of the frost to meliorate it. There is but little art required in this
step,

step, except that ploughing up the ant-hills has been practised in some places first; and after they have been cut to pieces with spades, and properly distributed about the ground, they have begun upon the whole land, and ploughed it regularly through, land by land. This method is certainly to be preferred on account of its neatness, as the whole will thereby lay in a more husband-like manner: but where the ant-hills are of a stubborn, golty clay, the part laying immediately under them cannot be of a better nature; therefore by this system of ploughing, the whole of such undesirable part of the mixture comes in contact with the natural soil, at one and the same time. Whereas by
 plough-

ploughing through the whole as near as possible at one time, the golty clay laying under the base of the hills is not so immediately disturbed. However it can make but little difference which plan is adopted; except when such land is intended for cropping with grain after the first ploughing.

In that case by pursuing the first mode of breaking up, the crop would not be so good, as a greater quantity of dead unfriendly clay would come on the surface, though the land would lay in a more husband-like manner, than by pursuing the last mode, which if the season proves favourable for harrowing in and covering the

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grain,

grain, would produce the best crop. Therefore I should recommend the ploughing the whole up at one time upon poor land, and upon land of a better quality, I should prefer the other method, both when it is intended to be fallowed and cropped; and the best method is to sow this sort of land in the spring following with oats or brank, or the best part with oats, and the other part with brank. The brank will be found most beneficial, being more meliorating: but too large a quantity of it, in a country where its use is not well understood, might not be desirable, though its excellent quality in feeding hogs and poultry cannot be surpassed.

The

The course of husbandry as follows,

First Course,

Oats and buck wheat *alias* brank,

Beans or pease,

Wheat,

Fallow and turnips,

Red Clover.

The above is the course of husbandry, when such land is intended to be continued arable, or when intended to be laid down for pasture; and time can be allowed; except that white *Dutch* clover and proper hay feeds should be substituted for the red clover, when the land is to be laid down permanently. By this course of husbandry, time is given for the old turf and sedge, &c. to

rot, mix, and incorporate with the natural foil previous to the fallow. It would certainly be a more expeditious method of laying down such land to pursue the following course.

Second Course.

Oats or buck wheat, *alias* brank,
Fallow and turnips,
Barley,
White double clover, and fine
hay feeds.

Third Course.

Fallow upon the turf and turnips,
Barley,
White *Dutch* clover, and hay feeds.

✕ Wheat must never be sowed as a second crop, after breaking up old pasture ;

pasture ; the soil lies too hollow at that time for wheat, which is most subject to have its roots eaten by grubs and worms.

But of all methods the first course is the best, as the soil will be the best mixed ; and if the land is not very poor, it will repay a farmer something for his labour and expence of seeds, without being impoverished or exhausted. The intermediate crop of beans, if properly hoed, will be as good as a tolerable fallow. According to the degree of poverty in the land, the second and third course should be used ; but in either of the two latter courses a farmer would be at greater expences than the produce would answer ;

answer ; and if any part of such pasture land was uneven and tough, it might be a work of great labour and expence to fallow immediately upon the old turf, if it could be effected at any rate.

Another great advantage, a farmer would derive from breaking up such land as I have described, is, by the quantity of manure arising from the cropping of such old pasture land ; so that every field or succeeding parcel of land broken up, will afford a superabundant dressing of manure to the preceding field : especially when added to its own produce of manure derived from the last crop, to be laid on when the same is laid down

down with grafs feeds. Adding to which advantage that of occasionally manuring the best of the antient pasture land, which may be fixed upon to remain in that state. And as ant-hills have their origin from the neglect of rolling, it is almost unnecessary to recommend it as the most essential practice upon all pasture land, in the spring of every year, after the same is bush-harrowed, to separate the dung which may remain thereon.

The regular distribution of arable and pasture land upon every farm is the most material consideration, and an object of the highest importance both to landlord and tenant; and so much

much so, that the very existence of tenants depends upon this point, viz. whether the quantity of arable and pasture land upon the respective farms bear a due proportion to each other, according to situation, quantity, and quality of the land so allotted. No farms are so advantageously laid out as those, which consist of both arable and pasture ground in such different states, as to serve for assistants to each other, in forming a complete system to the farmer's and landlord's advantage. The arable land affording straw, litter, clover and turnips, all of which are assistants in feeding of cattle taken up from the pasture ground, not ready for market; besides the immense increase of manure arising from

from such productions and by the cultivation of clover and other artificial grasses, the pasture land is in a great measure manured, and saved from being mowed; which upon high land when frequently practised without making a very ample return in manure, is sure to destroy all fine natural grasses.

The pernicious practice of mowing high antient pasture, which is universally followed under the plea of necessity, (a very forcible reason, when a farmer's chief occupation consists of such ground,) must reduce it greatly in value, as he has no return of manure for the land. Mowing has the same effect upon the general product

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of

of the land, as we allow it to have upon weeds; which, when cut in the most luxuriant and sappy state, are in the end effectually destroyed. Therefore in order to remedy this inconvenience, I recommend, that every farm upon high land should contain both arable and pasture, where the soil can in any respect be converted to turnips and clover. Husbandry and farms consisting chiefly of pasture ground, should have at least one third converted into tillage, subject to such modes of management as are pointed out upon the respective soils to which such land broken up may be allied in nature: and it will be generally found, that the soil, which is most adapted to answer the purpose of conversion

version, will cut the worst figure as antient pasture.

I would by no means be thought to recommend the ploughing up and converting to tillage meadow land, or such as is subject to be enriched by flooding; nor at the same time those finer tracts in many countries which lie near to, or skirting on fens. But doubtless in a circle of three or four hundred acres, even adjoining to such land, there is a middling sort of pasture or arable, which might be most profitably adapted to the plough for the purposes already mentioned.

There is a vast deal of middling pasture land in *England* and *Wales* of

which whole farms consist, very unprofitable to the occupier in that state. A farm composed wholly of pasture, unless of a very prime quality, only answers to the grazier as a kind of *Lamm* land. If the cattle and sheep which are bought in at spring and put to feeding, are not fat by the decline of the grass in autumn, on account of dryness in the summer, or any other cause, they must either go to market in that state, or artificial food, (as it is called,) such as oil cakes and hay for them, and turnips or cole-seed for sheep, must be procured. In one case the expence is likely to exceed the proposed advantage, and in the other, the cattle would go to market at the very cheapest time of the year.

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Besides these disadvantages, the mowing a considerable quantity of the pasture, perhaps one third, must be inevitable; especially if any dairy, breeding stock, or store cattle were kept in the winter; there being no straw yard to winter such cattle in. Upon farms of the best land wholly consisting of pasture, the disadvantages of having no resources, except hay immediately derived from the farm, to feed cattle in winter, are very great; because even where hay is extremely good, it is but a slow feeder of stock. It must be allowed, that upon the best land the goodness of hay depends upon the precarious weather, and in a more nice degree than any other production for their support in winter. It

It must be remarked, that if hay is not derived from meadow grounds, the very production of it exhausts the soil; as no return of manure can be made upon a farm consisting wholly of grazing land to repay it. If estimated nicely it would be found, that the utmost quantity of manure arising from hay, does not make a return for a tenth of the injury the land receives. Add to this the disadvantages of sending stock to market even in a fat state in autumn; or the expence of maintaining them through the winter, with oil cakes and hay for larger cattle, and turnips or cole-seed for sheep; when by these means are they usually conveyed from under a grazier's eye to a situation many

many miles distant from his own habitation. This being frequently the case, if no estimate is made of any sufferings from neglect, the land of another person becomes enriched and not that of the owner of the stock.

I say these circumstances must not be set in competition with the same farm so adapted, as to afford not only good pasture land for feeding cattle in summer, but also turnips, an excellent feeding for every kind of cattle in winter; straw for warm litter, contributing not only to the feeding but to manure, to repay such small quantities of land as may be necessarily mowed; clover or other artificial grasses to save mowing anti-

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ent pasture in a great degree; and to produce manure: a warm straw yard for store cattle to eat up refuse turnips, and to make manure. It is well known, that cattle intended for fattening are most profitably purchased by a grazier in the autumn before they are wanted for feeding; not only because such cattle are cheaper, but that it is good husbandry to have them to gnaw the remains of coarse grass upon feeding or pasture land. Ploughed land highly cultivated with turnips and artificial grasses can spare a part of the manure arising therefrom to enrich other ground. Besides these advantages, an occupier does not wholly depend upon the product of one article for his sheet anchor, but will

will have two, viz. both corn and grazing; and when one fails, the other may succeed.

It is necessary in almost every situation, that a farm should consist of pasture land, as well as arable; and therefore wherever nature has denied the advantage of good antient pasture ground, clover, rye-grass and other artificial grasses will make no indifferent substitute, according to the modes of husbandry I have recommended on different soils.

OF PLOUGHING.

THE implement called a plough, with which the purpose of breaking up and separating soil is effected, is of various sizes and constructions, in a great measure peculiar to different countries, and soils; and in a variety of instances properly adapted thereto, though differing in its formation. The intention of its operation being in some countries to preserve three points, in others two. In the counties of *Norfolk* and *Suffolk*, where the preservation of all land in a flat state in the time of fallow is a material object for the purpose of ploughing the land across or in contrary directions, ploughing it in straight lines is the

the first object. The second is ploughing each furrow parrallel to the foregoing; and the third is keeping the bottom of the plough parallel to the surface of the earth in an equal depth of soil : in which several points the farmers in the counties I have mentioned have the undoubted preference over all others in England. But it is to be remarked, that the soil of those counties, as well as their ploughs, are generally best adapted to answer the several intentions.

In counties where the land is ridged up according to the modes of antient husbandry, which I have already described, the two latter points are alone necessary; and ac-

according as those several points are preserved, it is good or bad ploughing. Different constructions of ploughs, as they may best answer the situation and temper of the soils, and the intention of the occupiers, should be adopted.



OF FALLOWING.

THE intention of fallowing being properly to sweeten land, by exposing all that part of it which is intended for the production of wholesome vegetables and grain to the influence of the air, frost, and sun; to pulverize the soil in order to bring all the latent seeds of weeds into vegetation, as well as to break the roots of others, and thereby to weaken, dry up, and destroy them. The readiest mode of effecting these several designs is undoubtedly to be preferred; and that will be found by breaking up the land intended for fallow, as soon as the stubble can be got off after harvest, if wheat was the
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the last crop, and it is a farmer's intention to sow with rye or tares. It is exceeding good husbandry to sow light loam with rye, and strong loam with tares in this manner for early feed for ewes in the spring, and to harrow them in as soon as the land can be ploughed after harvest. But where no rye or tares are intended to be sowed, the month of *November* will be found a good time for ploughing, or any other season when the land will plough well.

Great objections are made by farmers in countries of a loamy or clayey soil against this winter ploughing. They say that it chills their land by letting in the wet;—that by ploughing
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ing in wet weather, the land becomes starchy, or baked in the succeeding spring, and is immoveable;—that it is impossible to bring it to a good tilth in the following summer—and that it brings up a super-abundance of weeds. Therefore the common practice is upon strong clays, not to break up the land intended for fallow, till all the spring cropping is in the ground, which is about *May* or *June*, when it takes six or eight horses to plough effectually three-quarters of an acre per day.

To the first objection I answer, that upon strong loams or clays this work must not be attempted in extreme wet; and if the month of

Novem-

November proves so, this business must be deferred till the land will work better. In extreme wet the stubble, which ought (if possible) upon this sort of land to be ploughed under-furrow and not picked off the land, will drive on heaps. By ploughing the stubble in, the ground is laid hollow, the water is conducted out of it, and it will work the better for it in the spring. If early ploughing in the winter is such an insuperable objection upon this sort of land, how comes it to pass that farmers get any crops of wheat or barley upon their fallows: it being a common practice upon strong loams or clays in open field countries, to fallow one third of their land every year, one half thereof
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for barley, the other half for wheat. The barley land is not in many places ridged up until the wheat is in the ground, and then it lies in that state all winter.

The mode, I recommend, is to plough up the land intended for fallow in the succeeding summer (where there are no such tilths for barley) at the very time this business is generally carried on. Where there are such tilths for barley, to begin to plough up the land intended for the next summer fallow immediately after that business is done, or as soon as the crop of wheat is in the ground; and surely the difference of a few days cannot make the one ploughing an

advantage, and the other a disadvantage. But I must go so far as to assert, that old fallow land which has been in some degree pulverized by a summer's ploughing, will be more likely to retain wet to its prejudice in winter, than that which is newly ploughed up: when every seam or furrow, with the stubble turned in, will serve as a conduit for the water.

To prevent the land from getting starchy or baked in the spring, I would harrow it down well, as soon as possible: and if winter ploughing promotes the growth of weeds, I say so much the better; for if the land is not pulverized, and the seeds of
weeds

weeds are not brought into vegetation, they cannot be destroyed; the chief end of fallowing being to destroy the weeds. The common practice of fallowing, according to antient husbandry now pursued in open fields, is to break up the land in *May* or the beginning of *June*, and to let it lay in that state till *July*. Sometimes the business of stirring the land is deferred till in or after harvest; which stirring is but little better than turning the furrows back again into the state they were first in, without breaking or pulverizing them: the inconveniences of which business at such times need not be described. Harrowing is but very sparingly used, if at all, and in that state it lies till

the time of sowing wheat, when it is sowed upon the land and ploughed under furrow. Some farmers in open fields are rather more attentive, by giving the land an additional stirring; and in the intervals between the ploughings, by hoeing down thistles and other weeds, but all seem careful not to break or pulverize the soil; the contrary of which ought to be practised with every effort in a farmer's power, in order to answer the true proposes of fallowing, when land is foul.

So far this practice relates to open field farms upon strong loam and clays, where the whole intention of fallowing is solely for a crop
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of wheat or barley, and where the capability of the soil to produce turnips is not even attempted to be proved. The use and necessity of winter ploughing being I think uncontroversial, the land so broken up should be ploughed as deep upon very strong clays, as the soil will admit; because upon such strong land the difficulty of getting any deeper, when the dry weather in summer comes on, might be found insuperable. Upon mixed soil land or light loam, which might be foul and require cleaning, it would be good husbandry not to take the soil up the full depth in the first ploughing; but first to turn the soil up in part, and to clean it of the superficial rubbish; and then to take
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it up at the necessary depth, which could upon such land be effected at any time; and having the less soil mixed with such rubbish it would be the more easily separated.

The same process would be more desirable upon clays, on account of their adhesiveness when foul, but for the reasons I have given must not be attempted. Strong loam and clays, when broken up in winter, cannot be ploughed in too small furrows, thereby contributing to pulverization. Good fallows are much easier made upon lands that lay level, than upon those I have described to be ridged up. Upon a flat, the land may be ploughed across, or contrariwise to
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the last ploughings, and harrowed in opposite directions in order to break the soil in pieces. The process of fallowing light loam, mixed soil, or any other sort of land in level situations is best effected by beginning to harrow it across the last ploughing.

In the spring more particularly as soon as the land will work well, by breaking and pulverizing the soil, the weeds will begin to grow; and whenever it is reasonably understood, that the seeds upon the surface are all in a state of vegetation, it will be proper to plough the land across the last ploughing, if in dry weather so much the better—to let it lay in that state some little time, a week or fortnight

night according to the season ; if showery, the seeds of weeds that are uppermost will vegetate in less time ; then it will be requisite to harrow the land down remarkably well. If it proves dry weather, it will be proper to begin to harrow the sooner, in order to prevent the land from drying in large pieces ; in which case, when it so happens, rolling must be applied between the harrowings in order to pulverize the soil. The next ploughing, which will be the third, must be made in the same direction with the former, observing to divide the furrows in this, which were gathered together by the former ploughing.

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The same process of harrowing (and rolling if necessary) must be practised, as recommended in the first stage of this business; so that the land may receive the fourth ploughing in the beginning of *June*, if it has been foul; four ploughings in the whole might be sufficient, especially, if the land comes into a fine state with the third ploughing. Immediately after this the dung should be set on. When turnips are intended to be sowed, the land should be ploughed in the same direction which it was in, when first broken up; and this ought to be in a manner the most advantageous for carrying off superfluous or stagnated water.

The land laying in this state, and harrowed down in the beginning of *June*, will be ready to receive the dung which should be skimmed in half furrow deep in the last ploughing but one; the turnips should be sowed, and the land ploughed a full depth about *Midsummer*, or between that time and what is called *Old Midsummer*. Fallows intended for wheat or barley ought to be managed in the same way; though a farmer need not be so expeditious and watchful between the ploughings, as greater time may be taken. Land which is ridged up according to antient husbandry (though it cannot be ploughed or harrowed across, where there are grassy balks in the furrows) must, after

after great care is taken in ploughing it up in very small furrows, be harrowed and rolled, ploughed and pulverized in a manner most conformable to its situation. If it is foul, that all the weeds and seeds of weeds impregnated in the soil may be brought to vegetation, and the same number of ploughings practised as upon flat land. Attention must always be paid to stirring fallows, after the first ploughing; and it is absolutely necessary, that the wing or fin of the ploughshare should be answerable to the widest part of the bottom of the plough, that it may make no more way through the soil, than where the roots of all the weeds are cut. A good fallow is the founda-

tion of husbandry; the succeeding cropping entirely depends upon it, as well as the state of all grass feeds; and where land is laid down for pasture, its future value much depends upon the process of fallowing being duly executed.

Notwithstanding the arguments to be used in favour of winter ploughing for fallows in the succeeding summer, there are objections to be made to it upon thin-skinned clays, where the soil is naturally poor. In some parts of *Huntingdonshire* and *Cambridgeshire*, winter ploughing of such land has been attempted in several instances without success. I did not see the experiments made, but the circumstances have

have been related to me from persons of unquestionable veracity, viz. that certain parts of open fields consisting of poor clays in those counties having been broken up in the winter, the land fell to pieces with the frost, like a heap of ashes. The succeeding wet or rains beating it down, and mixing with the soil, by padding of sheep towards the spring, when the land was getting into a dry state, it became set as hard as the clay floor of a barn: sometimes it was more difficult to be ploughed than other parts of the same soil, which had not been winter ploughed, and in several instances it could not be ploughed at any rate. In open field countries such winter ploughing having
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been made upon land, which is mixed property, the flocks of sheep belonging to the respective parishes, where such winter ploughings were made, have padded over the ploughed land all winter: there being no reserve in common fields from them, except that part which is sowed with wheat, or intended for barley. Indeed half the dependance in common fields for the maintenance of the flocks of sheep in winter is upon the land designed for the next summer fallow. Consequently, if the practice of winter ploughing was to be made general in common fields, a great part of the support for a flock of sheep would be taken away. Therefore either other means must be found for their support,

port, or their numbers decreased. With regard to the first, it might be impossible to procure other means; and in case of decreasing their numbers, it would have the bad effect of decreasing the crops; as the best and principal manure, and a farmer's chief dependance for a crop of wheat upon poor clays, is from folding sheep upon his fallows.

The reason, why such poor clay as I have already mentioned set, and became so very hard towards the spring, might in part be owing to the land being ploughed deeper than it had usually been before; and therefore a stubborn clay was brought up into mixture with the natural soil. This
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might easily, and almost imperceptibly, happen at that time of the year, (in *November*) when the land would plough easy. Another reason, why farmers occupying poor clay do not immediately see the necessity of winter ploughing, is, that the land is fallowed according to their modes of husbandry every three years. They are very attentive to weeding their grain, and very strong clay is not so subject to get foul as lighter land.

Another argument might be offered against winter ploughing on this sort of land, which has great weight (when it is in a clean state) viz. that it would bring their land to a fine tilth, or pulverize it too much for a wheat

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crop; as it is necessary, that land sowed with wheat in open cold situations should not be broken too fine. The surface should lay full of round clods, which not only screen the roots of the grain from frost or blasts, but also serve to mould up the plants, as the clods fall to pieces by being exposed to the frost and air.

In *Cambridgeshire* there is a considerable quantity of light land upon which turnips are cultivated; but prevalency of custom generally hinders it from being broken up before the spring cropping is in the ground. The arguments used against the practice of winter fallowing upon strong clays can have no weight upon lighter

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soils;

foils; and notwithstanding the reasons alledged against this mode of culture upon strong clays, I should recommend a trial upon such inclosed clay land at any rate, without obstinate perseverance when it was found unlikely to answer the desired end. But upon every other foil, winter ploughing must be considered decidedly as a great advantage; except in certain common field situations, where a flock for folding the land cannot be maintained with winter fallowing, and the practice made general in the same field, so that the sheep could be kept off the land when winter-ploughed.

It occurred to me to enquire of the persons, who related to me the experiments

ments of winter-ploughing upon the clays already mentioned, whether the land, which had been fallowed in the preceding summer, and remained in a state of fallow for barley throughout the winter, (during which the soil of the same field had been broken up for that purpose) was alike affected with the frost and wet. I was answered that it had not the same appearance or effect; the fallow for barley having been broken up in the preceding summer, it was meliorated and did not become hard with the wet of winter; but on the contrary in the succeeding spring it ploughed like a heap of ashes, whilst the land, which had been fallowed in the winter, was so stubborn as not to admit of being ploughed.

ploughed. However it is to be observed, that in common fields the land, which lies fallow for barley, is generally intermixed with the land sowed with wheat, upon which part the sheep never come after it is sowed.



ON THE CHOICE OF SEEDS.

IT is necessary to observe two points in the use of all seeds; first, not to sow any seeds upon poorer land than that which produced them: secondly, not to sow any feed upon a cold land, which was produced upon a warmer soil, but to pursue the contrary practice as much as possible. The failure and the ill success of crops may often be truly attributed to want of attention to these points. It is quite needless to lay much stress upon the necessity of all seeds being clean, separate, and of a good quality, according to the purposes for which they are intended; it being obvious

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to all persons the least acquainted with agriculture.

With regard to the choice of grass seeds for perpetual pasture, it is necessary to observe well the best and most flourishing natural grasses produced upon the land to be improved. If such ground has been long in an arable state, it will be requisite to examine well pasture land in the same district and same sort of soil, and not to depend upon the skirts or borders of such field or fields, for the reasons I have before given; (though such appearances may be called in as auxiliary.) To procure a sufficient quantity of hay seeds, if possible, predominating with such approved natural grasses

grasses in order to lay down the land; which will be found a much better mode than procuring a sort of hay-feeds from the best land which might be foreign thereto. The one would be a native of the soil, the other an exotic. The latter without very extraordinary nourishment and care (which might not be consonant to either soil, circumstances, or situation) would perish; the other would receive every addition, which might be made to the quality of the land, as an obligation to be returned seven fold.

It is no uncommon thing with men conversant in practical husbandry to have seen land laid down with hay-feeds collected from a better soil, which
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after the best manuring that could be given have disappeared in a short time; in the same manner as an hot-house plant would have been affected by transplantation into the open air.

With regard to the quantity of grain sufficient to seed any given quantity of land, no general rule can be laid down; the soil, and condition of the land must determine this point. It has long been the general practice to sow grain sparingly upon good land, and as the land increased in goodness to decrease the quantity of seed; on the contrary upon poor land to increase the quantity of seed as the land declines in quality. The reasons generally given for this practice

tice are these ; that upon good land a small quantity of seed regularly distributed will branch into innumerable stems according to the richness of the soil, and thereby a full crop will be obtained, without overburthening nature with a superabundant infant production, which she cannot raise to maturity.

On the other hand for the practice of increasing the quantity of seed upon poor land, these arguments are generally offered—that as the land cannot on account of its poverty throw forth such abundance of stems or branches from the same root, as when good, it is necessary to sow a larger quantity of seed to fill up the deficiency of nature

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in the vacuums, which would otherwise remain unoccupied between the plants, if no more seed was sowed upon poor land than upon good. And secondly, that nature will produce something every where, and if corn is not planted in the intermediate spaces, weeds would inevitably spring up.

It is to be found that the usage is general, as to the modes of sowing the different soils, as well as the arguments. But if nature is to be so easily overburthened by a superabundance of grain upon good land, it is more reasonable to conclude she will be overburthened by a superabundant production upon poor land. There

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is no road to conviction on this point without consulting nature. Her dictates are those of truth, and may be depended upon. Every tree and plant in the vegetable kingdom requires a given space according to the strength of the soil, and the weight and strength of the object to be produced in bringing each into a state of perfection. If we look into the garden and examine the seed-beds of plants, we shall find that such as are suffered to remain there in a thick state, will never arrive at full growth : colliflower, brocoli, or cabbage for instance. On the other hand some of them taken from the same beds, and regularly distributed upon a necessary space of ground, arrive at maturity without difficulty,

Here we find that the infant production of nature upon the seed-bed was too abundant for her powers to bring them all to perfection. If the land had strength enough inherent therein to nourish such plants, and raise them up to maturity, space would not be wanted; because the plants in that case would grow up to a certain height, when the outside ones would decline into an horizontal direction to make room for the intermediate plants, that the whole might be brought into a state of perfection. Hence an obvious conclusion may be drawn.—That nature will produce more infant plants upon any given space, than she has powers to bring to maturity; and therefore as she

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has not set up a boundary or law for our guide in this point, we must make the best substitute in our power, which is the law of reason.

I have long made it a matter of particular observation, that such vegetables as produce most roots are slowest in the outward production. This may be exemplified by breaking up and comparing the roots of good and bad pasture land. It will be found, that the roots in good land are not so abundant, deep, and interwoven, as those on bad; as if the poverty of such land obliged the roots of plants to pervade the different particles of the soil, in order to seek nourishment
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and support. Therefore, if sowing an abundant quantity of seed would answer the deficiency in the richness of the land, crops would be nearly equal according to this system; and there is no doubt, but that it may be contended with truth, that poor land cannot bring so much grain to perfection as rich, and consequently less ought to be sowed. But when we come to put this scheme into practice in its full extent, and decrease the quantity of seed, as the land decreases in goodness, we find, that there is only a certain space to which roots of grain can extend themselves for nourishment; and if the land is deficient in the number of plants, there must of course be a vacuum
between

between the roots of each. Adding to which, that by reason of the poor-ness of land, a considerable part of the seed which is sowed upon it does not grow up, on account of the season, or the state and condition of such land, when the seed is put into the ground ; this circumstance ought to be a principal object of a farmer's consideration.

When grain goes into the soil in good seasons and in a good state, the less seed will answer the purpose, and the contrary should be observed in opposite circumstances. If all the seed which is generally sowed upon poor land was to grow up, and come as far towards perfection, as the soil
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was capable of producing it, very little grain would be obtained, and that which was produced would be lean, thin, and imperfect. Therefore the circumstances and condition of the soil, the season, and temper of the land must determine the quantity of seed to be sowed upon any given space.

With regard to the choice of artificial grass feeds, or any other small feeds, such as clover, trefoil, cow-grass, turnips, &c. I recommend it to every one to purchase them from the growers, and not from merchants or dealers in feeds. I have seen several engines or mills for dressing small feeds, where old, mouldy,
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or heated seeds have been dressed over in so nice a manner, that a very good judge could not distinguish them from the best new seed. And it is reasonable to suppose, that in a season when small seeds are cheap, dealers therein would speculate upon them, and lay up considerable quantities; of which perhaps, when brought to market a year or two afterwards finely dressed up, not a fifth part will grow. I know but of one expeditious way of discovering, whether small seeds will grow or not; which is by laying a certain proportion of any to be tried upon a flat piece of red hot iron, such as a poker; when all the seeds, which have a power to vegetate, will burst and fly

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off, while the worthless part will remain thereon and burn up. This may be depended upon.



ON THE CULTIVATION OF WHEAT.

THIS species of grain is produced of a good quality and quantity, when sowed immediately upon the roots of other productions of grain and vegetables, as clover, pease, beans, tares, St. Foin, and many other species of cropping, as well as upon fallows. It is not good husbandry to sow wheat upon oat or barley stubbles, which should be avoided as much as possible; not only, because the remains of the seed of such grain may get up with the wheat, and produce a mixed crop, but because the land has exhausted a part of her strength and powers in

the production of the preceding crop.

It has been a practice with persons, who have ploughed up antient pasture land, to sow wheat the second year after its being broken up, but I never in that case saw a tolerable crop produced. The land has laid too light for a crop of wheat; and in many instances the grubs or worms have totally destroyed the roots of the plants. Wheat should never be sowed so soon after breaking up antient pasture land, nor indeed till the turf is quite decayed.

This grain is of different complexions, as the white and red-skinned, the clog
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or bearded wheat. The red-skin-
 wheat is more esteemed, than the
 white, on account of its hardiness
 to stand the winter, its weight and
 the quantity of its product in many
 situations. In others the white-skin-
 ned is more esteemed, especially upon
 mixed soil or light loam; therefore
 experience and a competent know-
 ledge of the nature of the soil must
 direct farmers in their choice. The
 clog or bearded wheat, being of a
 coarse thick skin, and of a hardier
 nature, yet always bearing an inferior
 price, is generally rejected, except
 upon very cold poor land in wet situ-
 ations, where its product is larger
 than that of any other sort of wheat.
 Some farmers in open field countries
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sow three or four acres of it for bread for their families, on account of its increase, but the practice is not general.

Upon light loams or sands in some parts of *England* and *Wales*, it is an established custom to sow mistling or mun-corn, which is a mixture of wheat and rye in different proportions. It is good husbandry to decrease the quantity of wheat in the mixture upon very light loam or sand; on the contrary to increase the quantity, where the soil is of a stronger nature. There is no doubt, but that the value of a crop upon very light loam or sand is greatly enhanced by this mixture of wheat and rye;
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where if one part fails, the other may succeed. And the rye, being of a quicker growth in the spring of the year, will greatly forward the covering of the ground, in order that it may retain moisture.

This kind of cropping is a matter I should not recommend upon mixed soil, strong loam or clay, unless experience should require it. There is a great deal of land that does not bear wheat successfully, even mixed soil, as well as light loam and sand. The sort of land, my experience has remarked to be of this description, is a soil in some parts of *Huntingdonshire* and *Northamptonshire*, which is mixed with a ragstone, and with a bottom at eight or

or twelve inches below the surface consisting in many places chiefly of a ragged rock. The produce of this sort of land is very subject to be parched in dry weather, both arable and pasture. When in a state of pasture, it is of an early production in the spring of the year, and goes off very much in the middle of summer. I think it would answer well to sow a proportion of rye with wheat on this sort of land for the reasons I have before given, viz. about one third part rye.

Of late years a mode has been adopted in some parts of *Norfolk*, to set, or drill a considerable part of the wheat crop upon mixed soils, as well as
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light or strong loams, which has answered extremely well on several accounts. First, because by a regular distribution of seed in the ground, the crops have been larger and of a better quality. Secondly, because the saving of seed between the broad cast and drilling generally answers the expence of the labour; which as the business is for the most part performed by hand, at the rate of two children, either male or female, to one man or woman, a very considerable part of the poor are thus employed, which would otherwise be a burthen upon a parish. The saving in the seed may very truly be computed as so much contributed towards the support of the poor. The business of drilling,

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though customary upon clover root, may be performed upon any land, and after any cropping, provided the time of doing it is dry; so that the foil does not stick or hang to the instrument that makes the holes, or to the feet of the labourers.

The instruments, with which this business is performed, are made in the part which goes into the ground, like a plumber's foldering instrument pointed at the bottom, and increasing in thickness to about three or four inches upwards; and then they decline into a rod or iron with wooden handles like a shovel, and rather shorter; so that the person who makes the holes, walks backwards upon each fur-

furrow with one of these instruments in each hand for wheat or pease, indenting them upon the same furrow in two rows at equal distances; to each row of holes, a child follows the person who makes them, dropping the grain by hand into the holes, as they proceed along. After this the land is bush-harrowed over.

To persons unacquainted with this mode of setting or planting grain, it may seem a tedious process; but I have seen a regular proportion of wheat, pease and beans upon very large farms in *Norfolk*, planted in this manner for several years successively, without any apparent bustle, or extraordinary trouble, or anxiety to the farmers; as the business was always done in good
season,

season, and to great advantage. And what still favours the plan, instead of losing ground on account of its novelty ceasing, the practice of drilling is daily advancing. Surely it is a matter, which ought to excite an endeavour in all persons concerned in the progress of agriculture, to bring the practice of drilling forward as much as possible. In drilling wheat, pease and beans, and weeding or hoeing them afterwards, the industrious poor are employed to the farmer's advantage the greatest part of the year. By this the poor rates must be lowered; and there is certainly more merit in employing the poor to the mutual advantage of themselves and occupiers of land, than in the invention of an instrument

strument, that would complete this whole process with one hand at a single stroke. For if the business of agriculture could be carried on with fewer labourers, at first the poor rates must increase, and then the country would become depopulated; the produce of the land would be reduced in value, and at length would find no market.

It is a melancholy reflection, that depopulation is the sure consequence of the improvement and increase of arts. I never look into a mill completely geared, and worked by two or three hands, without reflecting at the same time, that before the mechanism thereof was improved, double the
number

number of hands were supported upon the same profits.

Wheat is subject to several contingent reductions of value in the crop, more than any other grain, by means of mildew, blast or blight, bunt or brand. The mildew is more frequent in such crops, as produce the largest number of stems or straws; especially in those of small inclosures, or lands lately broken up, as antient pasture: and it is more usual in a wet season, when the kernel is filling and changing to flour, or when the straw should change its colour. Human invention has found no means to remedy this evil further, than by sowing seed sparingly on such land, as is subject to produce
too

too much straw ; so that by not overcharging nature with a greater infant production, than she has power to raise to maturity, or by not having so great a production of straw upon the ground, the free circulation of the air, which may be necessary for the health of the crop, may not be impeded ; or that the waving of the ears of corn, when in the flower, may not so readily rub against each other, and prevent the grain from setting.

Attention to this point is highly necessary. As to the blast or blight, being a visitation of the hand of providence by lightning, or otherwise, it is impossible to offer any remedy.

With

With regard to the bunt or brand, which are certain black ears distributed in the crop, containing a smutty powder instead of corn, which is produced from a stem of equal thickness with the best grain, and equal length of ear, various causes have been assigned, and various remedies proposed. The most probable in my opinion is, that when the grain is setting, or immediately before the corn becomes firm in the ear, a grub or worm destroys the root, and prevents the intention of nature; thus instead of grain the black powder is produced. When this bunt or brandy wheat is mixed with the other grain in the thrashing, it becomes tinged therewith, which reduces
its

its value, as it spoils the colour of the flour. Most farmers object to sowing wheat thus tinctured, and alledge, that from sowing it, the same sort is produced.

I must confess, it does not meet my opinion, that it would be so; because, such as is defective (if the grain thus tinctured was rendered defective thereby) would be more likely to die in an infant state in the land, than to be produced as strong, and as perfect, as the best grain. The bad effects never appear until the crisis, when the kernel receives its formation in the ear. But as the common remedy is always near at hand, and easily purchased, it should always be

used, until the cause can be ascertained to a certainty—First, procure a quantity of seed proper for the land to be sowed, as clear from bunts, &c. as possible; and if not totally clear, mix a brine that will bear a hen's egg to float thereon; put the wheat into it, which is intended to be sowed the following day; or with a skep or basket immerse it therein, turning the wheat over, or stirring it frequently in the brine, so that all the defective grains may be brought upon the surface and skimmed off.

Farmers, who have invariably attended to this matter for a series of years, have assured me, that it has been productive of the best effect, and
have

have by way of experiment sowed a small part of their land with the same seed not brined, at the same time, which has had the contrary effect. Other farmers use urine in the room of salt and water, but it makes no difference in the effect, as no more is expected than floating the light and defective corn, and washing the remainder. Afterwards, in order to make the grain separate, and easy to sow, a quantity of lime is to be sifted amongst the wheat. It is unnecessary to recommend weeding of the crop in proper seasons, the practice being universally adopted.

ON THE CULTIVATION OF BEANS,
PEASE, AND OTHER GRAIN.

BEANS when sowed in the broad cast, which is usually practised in common fields, are for the most part too thick, for two reasons ;—First, because the land has not power or strength to produce corn on so many stems—Secondly, because there is a friction between the stems occasioned by the wind, when they are so very thick, that the blossoms are rubbed off, or otherwise prevented from setting ; and for want of a free circulation of air thro' the plants, the production is retarded. In common fields a mixture of pease with beans is commonly sow-

ed, but that is productive of the last evil complained of in the cultivation of beans in a separate state, by which practice hoeing and weeding are totally shut out; and sheep-feeding beans, when there is a mixture of pease among them, cannot be pursued, which is practised in some countries, and is a tolerable substitute for hoeing; especially as the sheep pick out the weeds only, and are thereby in part supported without injuring the beans. But this can only be done at a particular season, and cannot be put in competition with hoeing. The advantages of drilling beans and pease upon good land are not to be doubted, especially beans, which being planted in one row in the middle of each furrow are easily hoed.

As

As to the cultivation of barley, oats, or any other grain, it is unnecessary to enlarge upon that head further in this place, having touched upon it sufficiently in my section on the choice of feeds and dissertation upon soils. I then observed, that land cannot be ploughed in two small furrows in the last ploughing, more especially when it receives the seed in the broad cast. The advocates for the mixture of pease with beans argue in defence of the measure, that the beans are no worse a crop for having the pease mixed with them; by sowing both sorts, they hit upon a tolerable crop, in the produce of the one, or the other, and sometimes of both upon poor cold land, which is so ungenerous to the growth of grain,

that

that not more than half the seed which is sowed will grow. Therefore in this case great attention should be paid to the choice of the feeds. However this must be left to experience, when poor land is designed to be sowed; but upon tolerable, or very good land, these arguments have little weight.



ON THE CULTIVATION OF TURNIPS.

HAVING recommended winter ploughing, and well fallowing and preparing the lands intended for turnips, I shall not enlarge on this subject; but only point out the necessity of manuring the land designed for this purpose in a liberal manner; yet not with dung which is quite rotten, as is commonly practised. Dung in that state has in a great measure lost its heat, and is almost returned to a temperature similar to that of the soil upon which it is laid; therefore the good effect of the heat and fermentation, in forcing the plants beyond the reach of the fly, is in a great measure lost.

lost. Besides dung in that state, when its heat is abated, retains moisture better than when rotten.

In order to bring this matter properly to bear, the dung intended for turnips should not for the sake of convenience be thrown upon a heap, in a farm yard or field, so soon as is generally practised. This matter oftentimes depends upon the state and thickness of the dung, and where it is made; for if it is a very droughty spring, there may remain a large quantity of straw or litter in a dry state in a farm yard, which would require a considerable time to heat, when mixed with the dung from the lowest part of the yard, in order to

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make

make manure of it. Therefore the dry part should first be taken off the yard, and mixed with a proportion of the more rotten part not intended for turnips; or greater time must be allowed for the whole to lay in a heap. I make it a rule, that the dung should not be quite rotten, when laid on the land for turnips. It should also be ploughed in only to the depth of half a furrow, commonly called skimming in; so that whenever the land is ploughed the full depth, the manure may lie in the middle of the soil.

Between *New* and *Old Midsummer*, the business of sowing should be carried on with full vigour; observing
always

always to sow every day's work before the labourers leave the field. The seed should be harrowed in with light, short-tined harrows. In sowing it day by day, two good purposes will be answered. First, the moisture and freshness of the earth will make it grow immediately, if it be not a very dry season. Secondly, hoeing may be carried on with a regular stroke, as the turnips will not grow too fast for a proper number of hoers. A farmer, who begins to sow turnips early, has always the advantage of sowing a second time, if the first are taken off with the fly, or otherwise. A pound of seed well sowed is abundantly sufficient for an acre of ground. It ought to be well chosen, and either raised un-

der a farmer's own eye, or by a person in whose care and judgment he can safely confide. The value of the crop depends in a great measure upon the choice of seeds,

Various sorts of turnips have been selected, and seeds raised from them; but by some of the best judges in *Norfolk*, the white turnip is most esteemed with a single, smooth tap-root, and a single top not too large. This sort of turnip grows to a very good size, and buries near two thirds of itself in the earth. Its body is of a shape somewhat oval; and the upper part, or that from which the leaves issue, is in a great measure free from wrinkles or indentures like those on
the

the roof of an animal's mouth. This kind of turnip stands the winter better than any I have yet seen. First, on account of its going so deep into the soil, which is a preservation against frost; and by being so free from the lodgment of water under the top, on account of the smooth and oval form, its texture is firmer and clearer from being spongy or stringy than any other; and lastly, on account of the firmness of its quality, which is greatly owing to the transplantation every year, it will not run so soon towards seed in the spring by a considerable time, as most other sorts of turnips do, where care is not taken in the choice of seed, and management in the transplantation.

Objec-

Objections have been made to transplantation every year for feed, on account of the diminution of the top, and the tap-root; but there is no argument in this, if the body of the turnip or crop is not diminished by it, but a great deal of good may follow, for the reasons I have given. Several of the best farmers in *Norfolk* have sowed this sort of turnips I recommend, transplanted for the last ten or twelve years successively, and have found no diminution of their size and other good properties.

Notwithstanding the many publications in which directions are given for the cultivation of this inestimable root, (a farmer's chief dependance
upon

upon all sandy, and most loamy soils,) not a twentieth part of the turnips sowed in *Great Britain* are properly hoed. Even in this present season, I have seen some thousands of acres, in which from one to two pounds is lost in the value of each acre, for want of due attention to this point, and to the proper choice of seed. The *Norfolk* farmers contract with a man, or set of men, according to the quantity of turnips they have to hoe; six shillings and sixpence per acre is the common price for hoeing twice in the season; and if the labourers suffer the turnips to grow too large previous to their beginning this necessary work of hoeing, they will act contrary to their interest, as they are

under

under an obligation of setting out the turnips at such distances from each other, as they and the owners first agreed upon, whether twelve or fifteen inches. And therefore neglect seldom happens on this point, especially as the turnips grow in succession, as they are sowed.

The errors generally committed with regard to hoeing, consist chiefly in setting the turnips out too thick at unequal distances, or not setting them out at all, and not carefully cutting down the weeds to clean the land; the contrary of which should be observed without variation. The distance, which the plants ought to be set asunder, must be determined by the richness

richness of the land, and the species of turnips. Those I recommend will grow to the largest size, and therefore on open land in good condition should be set a foot or fourteen inches asunder, but not so much upon poorer soil.

It will not be improper to remark, that upon the light loamy soils in *Shropshire* it is almost an universal practice to lime the fallows for turnips at the rate of about three chaldrons to an acre, which is attended with a good effect. The farmers there reserve their dung for land in other states. In many places lime is procured at a great expence. Therefore dung upon the fallow intended for

A a turnips

turnips would certainly answer the purpose as well, if not better than lime; especially, where farmers in prudence would not go to the expence of lime, but for the erroneous opinion that a crop of turnips cannot otherwise be produced.

It may possibly seem needless to observe, that in hard frosts and deep snows it is a difficult matter to gather turnips; besides they are not thawed till eaten, which is sometimes productive of bad effects. It would be good husbandry for a farmer always in winter to avail himself of fine weather, that the turnips may be drawn clean. It is also requisite to lay as many on small heaps on the edges of the several lands
where

where they are produced, as will last for two or three weeks' consumption. And though the outside turnips may be frozen, the inside will do well for fattening cattle, and those that are frozen may be thrown to store cattle. It has been recommended to stack up turnips, or lay them in the bays of empty barns, but it cannot be reduced to general practice; and I should rather prefer the first method, as equally useful, and attended with less trouble; because it is uncertain when bad weather may come, and if turnips are long laid up in close places, they will not be so inviting as they were when fresh, and may be more subject to rot than in the open fields. A fortnight or three weeks

before the turnips are all expended, it would be good husbandry to draw them off the land where they grow, to prevent their running up to seed, and exhausting the ground,



ON THE ADVANTAGES OF A SUITABLE
STOCK OF CATTLE.

EVERY farm is of most advantage to the occupier, which produces or maintains the most valuable stock. A necessary attention to breeding, fattening or maintaining stock of the highest value any soil is capable of, ought to be the leading principle of every farmer, wherever he may be placed. Yet so little is this object attended to, that in the course of my experience I never saw a farm stocked to the greatest advantage. I am bold to make this assertion, for I know it to be true; nor have I any doubt of my being able to make it plainly appear.

appear. I abhor laboured calculations, which with regard to experiments in agriculture have been often stretched beyond the bounds of credibility. I shall offer nothing on this head, but what I am confident will meet the ideas of every dispassionate and impartial husbandman, and what is in every farmer's power to carry into execution without extraordinary labour or expence.

The great points, which every farmer ought to consider, are these ; viz. whether the stock upon his farm is best adapted to the soil and situation, and whether it is of an improving or declining kind. If we consult only the size of animals in a state of nature,

nature, they would characterize the soil, or nearly so. Though it is to be remarked, that any spot of good land being overstocked with breeding cattle, will make the stock degenerate with regard to size and shape, till they become as bad as those bred on poor land. Starving young cattle is sure to spoil the shape of the best sorts * from the *Highlands* in *Scotland*,

* In raising young stock of any beast kind two material points should be invariably attended to, viz. to keep each year's production as separate as possible; the oldest being too apt to drive the youngest from feeding, especially in confined situations in winter, and thereby take the best of the food away from them. Secondly, that young stock cannot be too much attended, and nursed with care, in order to raise them to perfection. Want of attention in these points is sure to spoil the shapes of the best breed, and is likely to destroy that inherent principle upon which I so much depend; viz. the aptitude to become fat when full grown.

Scotland, to the rich marshes in *Lincolnshire*. But it is the formation of animals, upon which the valuable quality of aptitude to become fat, and heavy depends. Here the skill of the grazier should be displayed in making a judicious choice of stock. Animals are like fruit-trees, which without being selected, and grafted properly, remain in a rude state, and not so profitable to man, as they they might otherwise be made.

Upon the *Highlands* of *Scotland* a sort of bullock may be selected, that will become fat in half the time, and produce one third more weight, when fat, than others which are of the same apparent size, and fed on the
 same

same land. This remark may be extended to cattle in the rich marshes of *Lincolnshire*, and holds good with regard to all animals in the creation.

Every person the least acquainted with cattle, has some idea of what is commonly understood by a good mould; particularly with regard to horses. There are many instances, that a horse of this kind will be supported in a thriving condition upon food of an inferior quality, and a less quantity, than is necessary for horses of a contrary description, and endure twice the fatigue. Yet lest some of my readers should be at a loss to understand what is meant by a good mould, I shall briefly describe a

horse of that sort. He is short-legged, deep in the four quarters, and round, deep and close in his ribs, his neck of a good length to take his food off the ground with more ease, his back straight and short, his loins broad and well filled up, his quarters oval, and his gaskins full. The same observation will hold good in some measure with oxen, and other cattle; except that it is not necessary, that oxen should be short in the back, or so close in the rib, or narrow in the shoulders; they should also be free from gum, and yet as heavy as possible. The size of an ox is immaterial, if he is of a proper mould; one of four-score stone may be fed upon the same land with one of fifty or sixty stone

if

if he is of a sort apt for feeding. Very little more aliment is required to support a large animal, than a small one. 2 ✓

Whenever it can be done, let care be taken that animals are not bred or brought up upon better land, than that on which they are intended to be fatted. But this matter is not so absolutely necessary, where a grazier gives his cattle room enough, and does not overstock the land; and it is of no consequence whatever, when cattle are intended to be fatted with turnips and artificial grasses. The breed of cattle of all kinds may be improved to a great degree of perfection without improving the land

at the same time. An ox or cow of a good sort may be supported in better condition upon the same land with the same quantity of food, with one of a less value by fifty per cent; the difference of value depending upon the formation of the animal and its age, more than the apparent size.

However this assertion may differ from the common received opinion, it is true. It has been found so in experience by Mr. BAKEWELL of *Dishley*, in *Leicestershire*, one of the best judges in *England* of the value and breed of cattle, and may be depended upon. For want of attention to the breeding cattle of a good sort, take *England*, *Scotland* and *Wales* together, no less than

than thirty per cent. is totally lost in the value of all the cattle; and of sheep, a considerable deal more on account of the wool, which might be improved annually.

There is a breed of sheep peculiar to almost every county in *England*, which being properly mixed together would be a considerable improvement to each. It admits of no doubt, but that from every flock of sheep, or herd of cattle, a sort might be selected, which are with respect to their shape and wool superior to the rest: from breeding these together, an improvement might be made; but this would be advancing by very slow steps, when it is in every farmer's power to procure

a bull or ram of an improving sort in order to work an immediate amendment. This is the surest way to proceed, and far preferable to changing the females. All kinds of stock will degenerate from long usage of breeding them together on the same soil, whether it is good or bad.

This improvement is more likely to be effected by gentlemen of landed property, than private farmers. And whoever shall affect to despise these hints, may be informed, that notwithstanding the *Norfolk*, and *Suffolk* farmers stand first, as the improvers of land to the greatest advantage, by marling and the cultivation of turnips and artificial grasses, they have not yet

yet learnt the most advantageous uses to be made of them. The sheep of those counties are nearly of as bad a sort, as those bred on the most barren land, as are also their neat cattle. Their horses are of a better quality, but these are not so profitable as they might be made, as I shall endeavour hereafter to shew. The inclosed part of *Norfolk* towards *Norwich* and *Yarmouth*, as well as most parts of *Suffolk*, might vie with the county of *Leicester*, or any other in the breed of cattle; for where a farmer takes a farm for even a short term of years, if he can improve his stock thirty per cent. it must be considered as so much money gained.

This

This improvement in the breed of cattle has been attempted with success in two or three counties in *England*, particularly in the county of *Leicester*, to the immortal credit of Mr. BAKEWELL of *Dishley*. He carried the improvements on with an enthusiastic spirit, and expence, which would have done honour to a man of more exalted station and fortune; and tho' he sometimes lost sight of his own interest, there is no doubt but that he has been of infinite service to his country; and others have been greatly enriched by taking up only the profitable part of his bright example.

The most improved sort of cattle now bred in *Leicestershire*, *Derbyshire* and

and *Lancashire* are of all others the best; and this is certainly owing to the spirit, which has for a considerable time prevailed in those counties amongst gentlemen of landed property and graziers to improve the breed of stock. There it has been no uncommon thing for Mr. BAKEWELL, and others, to let a ram at thirty or forty guineas for the covering season, and a bull for sixty or seventy during the same time. Where a grazier was setting out upon a plan of improvement, and had a good sort of cattle and sheep to breed from, and could spare the money, it was worth his while. It cannot be supposed that the small farmer with slender means, should begin at the top of this improvement;

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provement; he must be content to proceed more slowly by taking the refuse of the great breeder. It would be a laudable undertaking in gentlemen of landed property, conducing highly to their own advantage, and that of the public, and might be effected without much trouble, where they reside upon their estates amongst their tenants, to purchase a better sort of bulls and rams; especially, when they keep any quantity of land in hand, and occasionally give the use of them to such of their tenants, as cannot afford to obtain them otherwise. This would set an example to others, who are attached to old customs and bad methods. Wherever turnips and artificial grasses are cultivated

vated in high perfection, the best cattle may be produced and maintained also.

The size of sheep, their fleece, aptitude to become fat and hardy, may be improved for the most part by the use of proper rams, with short legs, deep wide carcases, long necks, and fleeces of a good thick, curly, fine staple. Where sheep travel to and from folding, and are obliged to go a *great* way for their food, a farmer should not endeavor to increase either their weight, or that of their fleeces *too* much; it being impossible for them to support a great burthen of wool and thrive under such circumstances. Besides too much wool of a coarse sort

like that in some parts of *Lincolnshire*, which is hairy and separates upon the back, keeps the animal too hot in summer, and lets in the cold too much in winter, and is of less value ; nor is it possible for a sheep to feed its carcase and so much wool at one and the same time. Therefore a thick, fine, curly wool is to be preferred ; and by the improvement of a flock of folding sheep, it must make a material difference in a farmer's account, whether he has only five or six fleeces in a tod of wool of nearly the same value, or whether he has twelve ; not to mention the improved value of the flock.

This improvement may easily and readily be brought about by the
choice

choice of proper rams at a small expence. Only observe always to preserve a due equilibrium between the flock and the uses of it. The opposite extreme is pernicious. The keeping a folding sheep too heavy either in carcase or wool, is productive of bad effects. This error is more frequently incurred on a clayey, than a sandy soil, where sheep are obliged to live hard, and travel much. In the former case treading in wet weather is prejudicial to the land; but upon a light soil, where treading is highly beneficial, the heavier the animal the better.

With regard to folding sheep for the benefit of the land, I am of opinion

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nion they are not injured by it under the superintendence of careful shepherds; who particularly observe not to fold them in wet weather, nor to suffer them to graze upon land, which has been partially flooded by the overflowings of brooks or rivulets in summer-time, or when they have been lately shorn. Those, which are kept for folding, are more likely to suffer by these things than any other sort. Ignorant shepherds are covetous of getting the earliest bite of such fresh grass as springs up after floodings; which folded sheep swallow with more avidity, in consequence of their having been fasted in the fold and thereby the rot is contracted. This, in my opinion, is nothing more than a lax or
scouring

scouring occasioned by such watery
grasses, an obstructed perspiration, or
any violent cold producing inflamat-
ed lungs, and then a consumption.

If we consult nature, we shall find
she had two particular views in clothing
sheep with so warm a covering ; first,
she did it for the use of man ; and
secondly to defend their tender bodies
from cold, which are less hardy than
those of any other animal. Therefore
too much care cannot be taken of
them for a long time after they are
stripped of their fleeces. But they
are by no means benefited from being
folded, as many persons in different
countries are pleased to assert. To
support this opinion 'tis said, that
they

they take their food at regular intervals, when kept for folding, and are thereby restrained from eating the wet grafs early in mornings, which is deemed unwholfome, and that when turned out to fat they thrive the fafter for it. But it is evident, that when they are turned out of the fold for fatting, and have a full fcope at the raw watry grafs, they are more likely to receive injury thereby, than if they had been constantly ufed to take their food at fuch times in common with the other parts of the day. Therefore under fuch circumftances to fay that fheep will feed the fafter for being folded, is to affert that they thrive the better for being permitted to take their fufenance in an unwholfome ftate.

The

The universal practice of folding sheep, which prevailed before the considerable inclosures of waste lands and common fields took place, is now in a great measure left off; as the advance of rents has put farmers more upon their mettle, and they find that they cannot afford to sacrifice one part of their farms for the benefit of another. The folding flocks maintained upon un-inclosed commons, and common fields are considered as supported upon waste land, bearing no rent, which is in reality so much pasture ground sacrificed for the good of the arable; the wool and increase bringing but little profit to the farmer, beyond keeping up the quantity or number of such necessary flock; be-

sides sheep maintained upon wet land in common fields are very subject to the rot and other losses. Therefore the cultivation of turnips and artificial grasses must ever be considered as the highest improvement, rendering the fold unnecessary, except upon very poor land.

If farmers and graziers are pleased to say, that they can buy cattle to feed, cheaper than they can breed them; and that good land is generally too high rented to keep breeding stock upon it, I will grant it with regard to oxen; but there are very large tracks of land yet remaining uncultivated in *England, Scotland and Wales*, which have been, and are at present
unfit

unfit for any other use but that of breeding cattle. Land which produce so little rent to the lords of the respective countries, that the occupiers can afford to suffer their cattle to remain to a proper age for feeding, before they are drawn off for sale. Though such cattle are for the most part of a moderate sort, which proceeds principally from the want of attention to the breed; and from the land being generally overstocked, and very little care taken of them in winter. If more rent was put upon the land, or upon the property on which common rights depend, these necessary attentions I recommend would be paid; by which the land-owners and the community

munity would both be benefited, as well as the occupiers.

But these arguments have no weight with regard to milch cattle and sheep, on account of the annual profit in milk, wool, increase, and reserved value. Therefore such people as hold an opinion, that good land is not adapted for breeding cattle and sheep of the best quality, labour under a very great error; but they are extremely right, if they view the subject without my proposed improvements in the breed. With regard to the declining value of stock, it may be asserted with truth, that very few farmers are so attentive as they ought to be to this point; and therefore suffer considerable

able annual losses. Every farmer ought to have a view towards the reserved value and disposal of each animal bred, or brought up on his farm, beyond the immediate use. And no animal should be kept after it is past the highest state of perfection, but should be converted to such purposes as may be most profitable to the owner, and serviceable to the community.

The Horse should be of such a sort according to the soil, (tho' I admit of no very heavy horses in agriculture, nor of the ox by any means, their motion being slow upon light land, and their carcases too heavy upon wet or clay land, where treading is greatly

in-

injurious) that he may be made up for sale, when seven years old. He is then in the highest perfection for either coach, stage, waggon, or dray; tho' for the last very heavy horses are preferred. Custom more than necessity has brought this preference; for more active horses would go the oftner, and upon the pavements in *London* would last longer than a heavier breed. The cow should be turned out to be made fat before she becomes too coarse in her bag, or declines in her quantity of milk on account of age; the ewe should be fatted, or sold for that purpose before she loses her teeth. The sow should be fed in proper time, not only on account of her decrease in value, but because she

is

is generally productive of mischief when she is old in throwing gates off the hinges &c. In short every animal down to the fowl should be drawn off from a farmer's use, when at the highest value, and their places supplied with successions of young stock growing up to perfection; and in whatever instances attention is not paid to this plan, a farm is not stocked to the greatest advantage.

The immense difference in a farm for twenty-one years, between a declining stock, and one improving in value, may easily be seen by the two following calculations, which I have made upon horses for that time.

CALCULATION upon a Stock of Horses declining in Value, for a Term of 21 Years.

Dr.

Cr.

<p>Ten Horses purchased in at 15<i>l.</i> per Horse, at 3, 4, and 5 years old, but for the greater ease in calculation to take the average 4 years old.</p> <p>Decrease of the value of each horse, after 3 years of the term at 1<i>l.</i> per head, for 8 succeeding years, with interest simple and compound on each sum.</p> <p>Purchase of one horse every year for the last 10 years of the term, on account of losses through age and decay, at 15<i>l.</i> with interest simple and compound thereon</p> <p>Admitting that for the last 10 years of the term, a horse is every year purchased at 4 years old, to supply the place of one dead through age or decay, there will be 10 horses, losing 1<i>l.</i> per head each in the 12th year; 9 losing 1<i>l.</i> per head each, in the 13th year; and 8 losing 1<i>l.</i> per head each, in the 14th year; 7 losing 1<i>l.</i> per head each, in the 15th year; 6 losing 1<i>l.</i> per head each, in the 16th year; 5 losing 1<i>l.</i> per head each, in the 17th year; 4 losing 1<i>l.</i> per head each, in the 18th year; and 3 losing 1<i>l.</i> per head each, for the remaining 3 years, with interest simple and compound upon each sum.</p>	<p>£. s. d.</p> <p>150 0 0</p> <p>100 1 10½</p> <p>197 16 0½</p> <p>79 11 5¼</p>
<p>£ 527 19 4½</p>	

<p>Value of 10 Horses at the end of the term of 21 years</p> <p>£. s. d.</p> <p>150 0 0</p>

Balance against the farmer 377 19 4½

£ 527 19 4½

CALCULATION, upon a Stock of Horses increasfing in Value, upon a Farm of the fame fize for a Term of 21 Years-

Dr..

Cr.

	£.	s.	d.
Twelve hories at 15 <i>l</i> . per hory, upon the average of 4 years old; as it is intended to keep an improving flock, it will be necessary to have two supernumerary hories, always having two colts rising 3 years old, purchased in every year, and 2 seven years old hories making up for sale ; but no allowance for the maintenance of the two supernumerary hories ought to be made, because a team of young hories do not eat so much, or require so much nourishing food as old hories, besides that their labour will amply compensate for their maintenance by their utility in feed time and other strait times.	180	0	0
The interest of 30 <i>l</i> . per annum, simple and compound for the whole term being the cost of two supernumerary hories.	52	15	5 ¹ / ₂
* Balance in favour of the farmer	355	4	5
	£ 587	19	10 ¹ / ₂
Twenty pound per annum for 18 years gained with interest simple and compound thereon, being the difference between the purchase of 2 colts rising 3 years old, and selling out 2 hories rising seven years old.	387	19	10 ¹ / ₂
Value of 12 hories at the end of the term, at the improved ages.	200	0	0
	£ 587	19	10 ¹ / ₂

* It appears from adding the Balances, of the foregoing Calculations, (which are very moderate) that it would make the Sum of 733*l*. 5*s*. 9*d*. the difference upon one and the same Farm for the Term of 21 Years, between keeping a Stock of Improving and Declining Hories.

It is unnecessary to make a similar computation upon cows, or any other cattle, as the foregoing case may be sufficient to convince every unprejudiced person of the solid advantages arising from an improving stock. No calculation is made or allowed for accidents, because they may happen on either side. The prime cost of the horses on both sides is equal; the improvement made in them consists in their growth only, and gentle usage when young, which the two supernumerary horses permit a farmer to attend to. And if there is a difference in the prime cost of either side, it must be allowed to be in favour of the improving stock; because colts of two years old are purchased at ten or
twelve

twelve pounds, which when made up for sale at seven years old, will (if they take a proper growth and figure) make from 25*l.* to 30*l.* And in the other case of working a team out, or keeping a stock of horses decreasing in value, and no more than are absolutely necessary for daily hard work, those of a greater age and price must be purchased, in order to forward the desired end.

There is a good moulded cart horse in the county of *Suffolk*, which of late years has been introduced into *Norfolk*, and may be considered as the best sort of horse employed in agriculture. Many of them have been used in gentlemen's carriages, particularly in those

those counties. I have known a farmer there sell a pair of those horses out of the plough for sixty guineas. Were it not for the ridiculous practice of cutting their manes and tails off, they would be brought into more use for the carriage, being generally of a fine chestnut colour, good trotters, and remarkably active. Should I ever be so happy as to see the plan of keeping a sort of profitable stock generally adopted, this kind of horse will be improved in the elegance of his figure and size without losing his other valuable properties, and will be in greater use for gentlemen's carriages.

Considering that horses make a very material part of our exports to
foreign

foreign countries, if the sort of horses bred in *Yorkshire*, was to be brought into more general use, especially upon all light or loamy soils, farmers would find their advantage in it. They answer all the purposes of agriculture in that county, and why might not the breed be more common. Objections no doubt will be offered to these plans, and many arguments used against them, especially by those who would rather continue to follow their grandfather's rules. The accidents such valuable horses are liable to, will be mentioned amongst others: to which it may be answered, that this improving sort of horses being either bred upon the spot, or purchased by a farmer when young, is easily made

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gentle ; and the prime cost of them is no more, but rather less, than such as are purchased at a greater age, with no other view but to be worked to death. Therefore these will be no more liable to accidents than horses of less value ; nor will their loss be more severely felt, especially when a farmer raises his own stock.

I cannot conclude this head without giving a piece of advice to all graziers, situate in the south and eastern parts of *England* in particular ; which is, that they should go down into the country where cattle are bred, when they want any to graze, whether it be *Scotland* or *Wales*, whereby they would obtain great advantages. First, because

because with their ready money, they would get the cattle cheaper than the jobbers could buy them on credit, which they usually do. Secondly, because they would have an opportunity of picking the best, instead of taking the refuse of all the fairs and markets in the north and west of *England*. Jobbers have confessed to me, that they generally sell their worst cattle in the south, for the same money which the best sorts were sold for in the north. A grazier not seeing a better kind, takes those before him, and picks his number out of one hundred head, which perhaps were the refuse of a thousand. It is astonishing that farmers suffer so much jobbing upon their stock. They buy of job-

bers, and sell to them, whereby a considerable part of their profit is consumed among a set of idle people, who live by their losses. Jobbers are supported like gamesters with this difference, that one of them have the rash and adventurous, and the other the industrious for their prey.

If it should be argued in opposition to this plan, that the expences of travelling and droving would eat up the advantages to be derived from buying a few cattle, I see no reason to admit it; but if so, let the neighbouring graziers agree to go down alternately to buy for each other, by which the expences would be no more than to jobbers on account of numbers, but
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less, as the cattle would come straight home, not being hawked about the country at an expence, and the reduction of their condition. The same kind of arguments will hold good with respect to a grazier's going to *Smithfield* either to sell, or see his cattle fold.



ANTIENT AND MODERN HUSBANDRY
 COMPARED; OR A DISSERTATION
 UPON MODERN INCLOSURES.

ANTIENT husbandry is that system of management, which we now find observed in common fields throughout different parts of *England*. In the fundamental parts of that system custom hath established a law, to which proprietors and occupiers of land are all bound to adhere in their respective parishes. Such as that a proportion of common, or walks for sheep, or cattle, and parts to be mowed, are allotted to each occupier according to antient custom, or according to their respective occupations; that
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all their arable lands shall be divided into three parts, fields, or parcels of the whole, is the common husbandry; that one part shall be fallow every year alternately; that particular times and seasons be fixed for performing certain duties to each other &c. &c. Where society is not concerned, a farmer is left to pursue his own management, according as his inclination or abilities may lead him.

Here it may be observed, that sufficient attention is not paid in open field situations, especially upon cold or wet spots, to keep the water courses and furrows clear from the lodgment, or overflowing with water, which often damage grain, and in wet sum-
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mers generally produce the rot in sheep. Where there is a rivulet, either from springs or drainings of the higher grounds, which runs thro' the fields in a crooked or spiral manner, a straight channel should be cut thro' the whole, with width and depth competent for receiving and carrying off the most hasty fall of water, and the subdrains may then easily be discharged into the principal duct.

Tho' each particular farmer is bound to consent, that one third part of the whole field shall be fallow every year, that each occupier may send his flocks of sheep at large, or fold them on that one third part, there is no compulsion to make any man a good farmer

farmer, or that he shall plough his land at all; but he may lay it down with clover or grain, and the flocks of the parish may come on and eat the produce without incurring damage.

Notwithstanding there are a few general principles in which the whole must agree, each farmer is at liberty to pursue his own ideas in all others. Good husbandmen, in the situation described, take care to keep up all the stock, which is allowed them; (unless by general consent a proportion is taken from each occupier's allowance thereof, in order that the remainder may live the better)—to fallow their lands at the most approved seasons, and manage them in the best manner

of the country—to divide their fallow lands into two parts, one half for wheat, the other half laying in a state of fallow all winter for barley—to fold with sheep the fallow intended for wheat, and dung the fallow intended for barley—Oats to be sowed upon the wheat stubble, and beans or pease upon the barley stubble; which is afterwards to be fallowed again, pursuing an alternate course of cropping. Such parts as were fallowed in one season for wheat, when the same comes round to be fallowed again, are sowed with barley; pease, beans, and oats are used in the same successive order:—So that the land is cropped with a similar kind of grain only every six years, altho the whole of it is fallowed once in

in three. Therefore from observing the general rules, according to which a farmer is bound by law to perform to his parishioners, he is at liberty to sow all his fallows with wheat, and all his breach or second crop with oats; he may repeat such usage without incurring any penalties or damages from the parish, that being a matter in which the land owner and tenant are alone concerned. But it is very bad husbandry to alter the course of tillage, so that the succession of any crop comes on oftner than every sixth year, especially upon poor cold clays. The land seldom recovers an innovation of this kind under nine or twelve years, tho' the best subsequent husbandry is pursued.

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There is in some fields or districts a loamy or mixed soil, which is well adapted for the turnip, or artificial grass husbandry, or inclosure. But I observe, that where such soil is found, general consent in some parishes has selected that part for the cultivation of turnips; and it would always be good management to find a substitute for oats in part, or the whole, (according to circumstances) such as clover or grass feeds. This would answer a good end, where a farm is deficient in point of producing hay or fodder, and where clover is made a substitute for oats. It might be proper to sow the clover alternately with the wheat; and the barley, pease, and beans to take the same regular

regular order, by which or any other mode, the intention of preventing a succession of cropping in a similar way would be the most forwarded. It is always good husbandry in open field farms, especially where there is but little pasture, to sow some land very thick with tares, oats, or rye to be cut green, to feed cattle in the stable or yards during the summer season.

The inclosure of open grounds or common fields, (a method every where prevalent of late years) has been in a great measure mis-managed in the setting out, as well as in the subsequent plans, (if any plans at all have been adopted.) I must confess,

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I have seen none that could be understood to be well digested; but such management as it is, I mean to distinguish by the appellation of modern husbandry. Public notice by an application to Parliament having apprized the respective tenants of such estates, as held them from year to year, or on lease, without proper covenants to restrain them to the best mode of husbandry, they took the alarm two or three years before the schemes were carried into execution; during which time the farms became badly managed, generally by the whole of the fallows being sowed with wheat, and all the breach or second crop after fallow with oats. By a quick repetition of crops, and an
 expen-

expenditure of the two last years manure, (which is commonly the property of tenants to their own partial advantage,) and other bad methods of husbandry, the lands have become impoverished and reduced in value.

The expence of the bill for inclosure, paying commissioners, fencing, quicking, building, &c. falling heavily upon the land owners, an higher rent was set upon such inclosures, which might be thought adequate to the out-goings, or in some measure advantageous to the proprietors. But mark the consequences! The old tenants, or those who occupied such farms, when in a state of open field, have taken them again at the advanced

vanced rents from year to year ; without (in most instances) competent judgment, or a view towards an improvement of the land by increasing vegetable and animal manure, or indeed beyond ploughing and sowing it whilst capable of bearing grain ; and when it became exhausted, it has generally been resigned into the hands of the owner to farm for himself, or to let again at a reduced rent. A different system ought to have been pursued, which I shall endeavour to point out.

All land whatever may be benefited and improved in its value, by being inclosed and made private ; but the great question is, under what circumstances

Cumstances are inclosures beneficial to the land owners and occupiers, when the expence attending such inclosures are thrown into the opposite scale? All sandy, light loam, mixed soil, and a great deal of strong loamy soils are highly increased in value by inclosure, as they afford an opportunity for the cultivation of turnips, and artificial grasses, besides the improvement which may also be made in the breed of cattle and sheep. The doubt principally lies with poor thin-skinned clays, unfavourable to the growth of turnips and artificial grasses; where little or no improvement can be made (except in the breed of cattle) to answer the expences of the

bill, commissioners, building, fencing and quicking.

Circumstances should be weighed with care between the improvement and expence, before this business is set about. A gentleman of landed property has a great deal at stake, when he embarks in a scheme of inclosing any sort of common field land. By this he destroys the antient husbandry upon his estate, of which the rent had been punctually paid; whilst the success of the new system, not only in the immediate advantages, but the future value of his estate, depends upon the competency of his stewards to make bargains, and fix covenants between him
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and his tenants. Before the inclosure of an open field is attempted, if proper leases and agreements are not subsisting between landlord and tenant, they should then be made, to compel the tenants to pursue good husbandry, and to remedy the evils I have pointed out resulting from a repetition of crops, and to make them preserve the dung of the two last years for the benefit of the respective land owners. Where valuable considerations are due in respect thereof, they should be allowed on the part of the land owner. As the villages belonging to open or common fields are set in a cluster with regard to houses, barns, yards, &c. and generally on the outside or bor-

der of a parish; upon the inclosure, a line should be drawn across the whole field by a road, and the part next the town should be allotted thereto in farms, in order to preserve a share of the buildings there, consistent with conveniency. The distant parts should be divided into suitable farms with proper buildings erected thereon. It is in this case that Mr. KENT's plan of allotting small farms, if gentlemen approve them, might be adopted. But people, only capable of taking small farms, are not the most likely to effect any great designs of improvement, either in point of property or ideas to apply it; being generally uneducated, and not extending their views so far as to expect future profit from present expence. If

If the county of *Norfolk* had been left to small farmers to improve, the rents would not have been advanced forty per cent. But to say that we are to reduce farms to their primitive size and uses is proposing an impossibility, much the same as it would be to bring about primitive manners, and can never be carried into universal practice. Where an estate is improved to the highest value, the scheme of dividing large farms into smaller ones may be adopted with some degree of success. But it is worth remarking, that the evil, which Mr. KENT laments, will produce its own remedy; for the engrosser of farms is not likely from a neglect of trifles, which he complains of, to acquire a property sufficient to settle

settle a family of children in farms of a similar size to his own; therefore in process of time he will be induced to divide his farm, or petition his landlord to make smaller farms, in which he may settle his children,

There is a fluctuation, or rise and fall in all sublunary things. States and empires are not exempt from it, more than private property. The increase of the metropolis, and of all manufactories of *Great-Britain* in the present age, as well as the easy communication by good roads through the kingdom between the metropolis and the manufacturing towns, have greatly tended to enhance the price of provisions, as Mr. KENT very justly remarks.

Soils,

Soils, which are subject to run, or fall with wet or frost, will not admit of deep ditching and banking; as the ditches will inevitably be filled up, in whatever direction the banks are laid. In those countries where ditching, banking, and planting quicks horizontally upon the sides of banks are practised to their advantage, it is not common to meet with a good quick; though this defect is abundantly made amends for by the ditches draining the land. This practice would be desirable upon all strong loamy or wet soil, if it could be effected: but when otherwise, double hedges, or posts and rails with two rows of quicks in the middle are the best method. Where bushes for hedging can be obtained,

tained, an hedge towards the north of a quick is warmer than posts and rails, and should be preferred. The land between the posts and rails, or hedges should be dug over or ploughed by way of a good fallow; and it should be manured previous to the quicks being planted, (except upon greenward or turf, where this process is unnecessary;) as the quick will thrive so much the better for it, and the production of weeds be less, on account of the fallow. By this the trouble of weeding, which is highly essential to the health of the quick, will be diminished.

After the farms are allotted, proper buildings erected, and the land divided

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ed into proper fields, they should be let on improving leases to substantial tenants capable of managing them. The leases should be drawn running for seven, fourteen, or twenty-one years; so that for the first seven years the tenant should pay the old rent, with the addition of five per cent. for all the expences on the buildings and inclosure of such farm. The second seven years he should pay the aforesaid considerations, with the addition of half the difference between such rent, and a fair quality price to be agreed on between him and his landlord; and for the third seven years he should pay the whole quality price, that is the stated price agreed upon between him and his landlord, and

not always to abide by the commissioners' quality price. He should also be obliged to preserve the quicks, and not to cut or plash any part thereof without ditching, back-fencing, and treating the same in an husband-like manner—to preserve trees, and the fences of them which may be planted near the quicks in nooks, and corners of grounds; (for by no means should trees be planted among quicks, on account of the damage the quicks sustain by their dripping, and the breaches made in occasionally thinning or cutting them down;)—to crop no kind of wood but willows without consent; and in a word, to pursue such modes of husbandry as shall be agreed upon between his
land-

landlord and himself, according to the quality and condition of the soil. Indeed the covenants with respect to accumulating rent during the demise must depend upon circumstances. Here the judgement of the steward is necessary; for by tying the hands of the tenant too fast, or relaxing too far on the part of the landlord, much evil may be produced.

There is no set of men I have a higher esteem for than farmers; but I must confess, that no set of men know better how to make a bargain for their own advantage. A steward ought to be careful how he allows the the custom of any country, for there is a good, and a bad one every

where. For instance, where a farmer is allowed to take only two crops and a fallow; and after fallow, turnips and barley, which is generally esteemed good husbandry, he can manage his farm so, that at the end of a term he will have sowed all his land with a successive crop; or having taken two crops, the whole will be to fallow by the incoming tenant in his first year, which will be an insuperable objection against any man's hiring it. Indeed the like advantages may be taken throughout the whole of a lease loosely and injudiciously made. And was the case to be litigated, in which a tenant had taken two crops and left all his land to be fallowed, it might be determined in the tenants favour

favour, he having only taken two crops to a fallow, during his term, according to agreement: therefore a man, who is a good judge of the properties of land, and its condition, will frame covenants suitable to each case, in order to remedy such an evil. For instance, a farmer should be bound not to crop more than a certain proportion of his arable land with the same kind of grain in any year of the term; not to sow a second or successive crop upon more than a certain proportion thereof every year; after which he should be constrained to fallow, manure, and sow turnips or coleseed, and to lay the same down with artificial or natural grasses for such a limited time, as should be approved.

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In some cases it might be advisable for a farmer to covenant to lay a proportion of his farm down for perpetual pasture at the commencement of the term, and to lay other parts down at stipulated times during the lease. However it is a landlord's business to improve the value of his estate, not only at the end of the term, but during the occupation; yet the great view ought to be directed to the end of the term, that the value of the land may not be reduced, but improved; and made desirable for a tenant to continue thereon, or others to take it.

The plans I have proposed will evidently tend to the improvement of an
estate

estate, to strengthen the hands of the tenant, and to preserve harmony between him and his landlord. Gentlemen of landed property would then have the happiness of seeing smiling plenty all around them, together with the daily advancement of their possessions; and those who have made the experiments of inclosing, and have had the misfortune to fall into the errors already pointed out, will, I am persuaded, feel the force of these arguments, and apply the remedies which have been recommended.

ON THE USE AND ABUSE OF LEASES.

THE gentleman of landed property, who should make a resolution not to grant any part of his estate upon a lease, would commit as great an error as he, who grants the whole in that way. There are but few estates, that are so circumstanced as not to admit of improvement; few on which an occupier of abilities might not lay out a considerable part of his property for the sake of future advantages to his landlord, as well as himself. On this account it is reasonable, that he should be secured in his expectations as far as human foresight will allow, and this

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is most effectually done by a lease. Though a gentleman's word may be as binding to him as his bond, his successor is not bound by it; therefore a farmer cannot be expected to lay out his money, which is often the dependance of a family of children, upon the uncertainty of an occupation from year to year. Such gentlemen, as are determined not to grant leases at any rate, must be content to let their estates beneath their real value, and neglect many useful improvements, which would tend to their own, their tenant's, and the public advantage.

Many gentlemen of this temper possess a pride in not raising their rents, and esteem all others poor, who

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attempt to make a fair income of their possessions. The tenants upon such farms are not found to be richer than those on improved estates ; for as they rent the land at half the real value, they are content to exert but half their industry: and consequently jog on in an antediluvian stile. There is no great danger of such estates being reduced in value by self-interested tenants ; on which account leases are unnecessary for the landlord's sake, whilst their farms are considered as hereditary possessions lineally descending from father to son. The trouble or difficulty of agency under such gentlemen is comparatively small. A superannuated domestic may do their business as well as any other person.

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An advance of rent would give a spur to industry by rousing the whole body of farmers into action.

Where an estate is let according to its fair value, a lease is as necessary to secure a landlord's interest in the premises as a tenant's. Where a farmer occupies lands from year to year, particularly arable lands, if he is self-interested, indolent, or injudicious, a farm may almost imperceptibly become impoverished before any alarm is taken. Indeed such farms generally fall into the proprietor's hands in the most wretched condition. I have frequently heard gentlemen of landed property complain, that they are considerable losers by farming; and

and it may reasonably be accounted for, since the land usually comes into their hands in a reduced state; and in that case, let who will be the occupier, two or three years rent must be sunk to restore it. Rent is an annual sum paid by the tenant to the landlord, without diminishing the value of his property; and when the value of an estate is reduced, it cannot be called rent, but so much deducted from the real worth of the possession. Proprietors of land do not all of them consider this matter in a true light; and when they can advance the annual income of their estates, consider it as rent, whilst the property is suffering in an equal proportion to the annual sum received during the demise.

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In the course of my experience, I have had applications from people to take farms consisting of arable and pasture, who have set out with a determination not to be bound by (what I conceived to be) the rules of good husbandry; but to do as they pleased with the premises during the intended demise. I always refused to treat upon such terms, well knowing the value of the land must be reduced. But when such matters have been represented to a principal, who was not a judge in these things, he considered such denial as foregoing his interest, by refusing what appeared to him to be a great rent.

There are particular situations, where long leases are unnecessary and

and improper; especially when farms consist wholly of rich pasture land, which will admit of no improvement; or farms lying near to gentlemen's seats or parks, where a disagreeable neighbour for a term of years would be a great inconvenience. Where gentlemen forego their own interest, and that of the community by not granting leases, by which it may possibly be imagined, such tenants would become independent of their landlords, they are guilty of a gross error; because when leases are properly drawn, it must always be highly to a tenant's prejudice to offend his landlord. Fortuitous circumstances ever produce some indulgence to be solicited from a landlord; even exacting rent on the
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days it becomes payable would be an inconveniency, which many tenants could not bear. All farms should be let upon agreements, whether for one year or twenty-one, in a judicious manner, as near as possible for the mutual advantage of landlord and tenant, always preserving the value of the land at least. Wherever agreements or leases are not made with such views, or directed to such ends, it would be better that no such leases or agreements subsisted. Tho' the value of the land would be likely to be diminished, yet abuses would not be so speciously practised, as when they are admitted by stipulated terms reciprocally established between the proprietor and his tenant.

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I cannot take leave of this subject, without recommending to all gentlemen of landed property, as well as persons desirous of hiring farms, to be cautious that farmers do not take more land than their circumstances will admit of stocking, improving, and managing to the greatest advantage. Tho' the ill consequences attending such practices, both to landlord and tenant, are flagrant, yet they are but too frequent; by which procedure many very industrious farmers have been ruined, and many estates brought into disrepute undeservedly.

ON THE ADVANTAGES OF SUITABLE
BUILDINGS ON FARMS.

THE next consideration to that of allotting land properly, is providing suitable buildings for carrying on the business of a farm to the advantage and comfort of an occupier. The sort and number of conveniencies ought to be nearly the same upon a small farm, as upon a large one, differing only in size. With regard to a house to be built upon any farm, a parlour, kitchen, brew-house, dairy, and cellar are absolutely necessary ; with chambers and garrets upon large farms, and chambers in the roof upon small ones. The front of the house

sisting of two rooms. The brew-house should be to the north-west, and set flush with the west corner of the house, so that there will be a nook or corner to the north-east, in which may be placed a dairy quite out of the influence of the sun, either by a lean-to, or otherwise, as may be judged most expedient, or least expensive. The rooms should be spacious, according to the supposed size of the family intended to inhabit them. The kitchen and the farm yard should be situated at the south-west end of the house. The kitchen door and window should open that way, by which means the farm yard and the dairy will be some distance asunder, and the milk not likely to be tainted by the effluvia of
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the yard, barns, stables, pigsties, cow-lodges, &c. Cart and waggon sheds, calf pens and granaries should be built of proportionable sizes according to the extent of a farm, or for the particular mode of occupying it. A ploughed farm should have the size of barns, stables and granaries increased, when it would not be necessary to lay much stress upon a dairy, cow-sheds, &c. and *vice versa*, the dairy and cow-sheds should be augmented in a grazing farm.

The mode, by which a farm is to be occupied, must determine the nature, size and quantity of the buildings. Upon a ploughed farm, it may be highly necessary to observe, that

all a farmer's loose grain, or such as is not tied up in sheaves, should be embarned. Wheat and sheaf corn suffers but little in proportion to loose grain by being stacked out of doors; especially where it is set upon a frame, and the rats and mice prevented from getting to it. However it is not benefited by it, when got in good condition, as some gentlemen assert; for who would get grain in bad condition, if he could avoid it? Wheat will keep as well in one of the barns, I mean to recommend, as when stacked out of doors; and no one can deny, but that it is less subject to damage in a barn, than from stacking and taking into the barn. I have seen a wheat stack slip down
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in bad weather, by which a considerable sum has been lost to the farmer; and the business of thatching in rainy or uncertain weather being performed hastily, and before the stacks are settled, they have received damage by admitting wet into the roof.

The great use of setting wheat out of doors upon stone, or wooden posts covered with tin, or wheat cases is, that rats and mice are thereby effectually prevented from doing damage; but it is a farmer's own fault, if these pernicious animals are troublesome to him; the means of destruction to them being easily had. In severe winters, I have been witness to great injury being unavoidably done to wheat,

wheat, beans and oats, stacked out of doors, even near a farmer's house by crows, pigeons, &c. All loose grain should be deposited in barns; for by all the loose grain stacked out of doors ten per cent. is lost. This matter will not be thought exaggerated, when the expence of first stacking and thatching is considered--the risque of bad weather whilst the stacks are carrying up--the inevitable waste by fowls and vermin whilst they are standing--the unavoidable havock made in taking them into the barn--the expence of labour attending that business, and the danger of bad weather a second time. A judicious farmer, when he is treating for a farm, examines and compares the number and size of barns, with the
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supposed produce of the land, making such an allowance for loss, as he conjectures will accrue to him from such deficiency as may appear; and consequently insists upon an abatement of rent equal thereto: in which case the landlord loses the ten per cent. upon the crop, and not the tenant. When I say a judicious tenant, I presume, that no gentleman, who understands his own interest, would let his land, if he could help it, to any other.

After viewing matters in a true light, any impartial man will see the necessity of proper buildings upon every farm; and that it is more to a landlord's interest to provide such as
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are necessary, than to suffer this loss. In many instances with adroitness in the negociator a farmer may be persuaded rather to allow five per cent. for the money expended upon an improvement of this kind, as an addition to his rent, than to remain without it.

It is necessary that every ploughed farm should consist of two barns, or at least two thrashing floors; otherwise one barn would be chiefly taken up in threshing grain for seed, or otherwise to exchange, or sell for purchasing feed, and no income could be made from one barn to defray rent and expences. Besides the loss of the fodder, of the manure, and straw for
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lean or store cattle in winter would be great, if thrashing a considerable part was deferred, till the cattle were turned out to graze in the spring ; to which might be added the expence upon thrashing in summer, or in the time of harvest.

I dislike burthening an estate with superfluous buildings as much as any man ; but necessaries must be allowed, with a view to the furtherance of a landlord's interest. The buildings upon a farm are not so expensive as are generally considered, if properly performed. Framed barns of wood with feather-edged boarding are of all others the best, and when covered with reed will last a century. Where

reed cannot be obtained, I recommend pantiles. First nail oak lath as thick as possible upon the spars, and bed the tiles in mortar, which will prevent their being blown or knocked off. Reed is best for the duration of the spars, but it may be fetched too far, and bought too dear, where pantiles can be obtained easily. Barns built of brick are the worst of all others on account of their closeness; if grain is not put into them in extreme good order, it is apt to be damaged, which is not so much the case with those I recommend, or any other.

ON THE MANAGEMENT OF FEN LANDS.

IT has been observed by many inhabitants of the sea coasts in the island of *Great-Britain*, that the sea gains upon the land in some parts and withdraws itself from it on others. This has led me to conjecture, that it may have withdrawn itself from the coast nearest to the low lands, which we call fens; through which the rivers communicating with the sea, could discharge themselves lower, and thereby considerably draw off the waters which were previously stagnated, or fluctuated higher and lower according to the discharge of water from the high lands. When such

waters were drawn off to the lowest ebb, the practicability of embanking the rivers, and erecting mills to discharge the superfluous waters from this kind of new created land, first presented itself. Which, except some breaches of the banks of rivers in violent floods of late years, has been carried into execution with great success.

This idea has the more weight with me, upon examining the soil which the waters have left. It is to all appearance a sediment of the finer particles of natural soil and putrified bodies, approximating to mud for a considerable depth, in some places many yards. And this opinion is rendered more
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probable by trees being frequently found laying horizontally a considerable depth under the soil in a kind of petrified state ; hence I am inclined to think, those trees could only be brought thither by violent floods from the high land. For a long time after the fen lands became in a tolerable dry condition, they remained uncultivated : people could not be found to embark in an adventurous plan, during the time they were covered with reeds, and such other coarse productions as are the growth of stagnated water. The parts intended for cultivation were preparatorily pared and burnt in dry summers ; since which time paring and burning seems to have been made an essential part in the management of fen lands. If

If we compare the nature of the soil, and the effects produced by paring and burning, the practice will, I think, appear improper. The soil consisting of a light subtil nature, stood not in need of being made lighter; or of ashes for a mixture with it in order to improve it; nor yet of being reduced lower, or less with respect to quantity, which effects are produced by burning. Though it might be found in the first instance necessary, of which I am not clear, to burn the rubbish upon the land, every subsequent effort ought to have been directed towards bracing together the loose particles of earth, of which it was composed; and this step could not be effected by the same kind of improvement which we adopt upon
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high land where there is a pan or fixed staple to the ground. Clay or marle or any other heavy body, would soon sink below the reach of the cultivator. Lime would answer the necessary purposes; and 'instead of ten farmers' cropping the land beyond its strength, then laying it down again with the worst of rye grass in hopes that in the course of three or four years it should degenerate into its original state, and thereby require to be pared and burnt, they ought to pursue a contrary practice as much as possible: When the land becomes dry to treat it in the same manner as other very light soils are managed in the high country.

For want of a pan or fixed staple, ten lands are very apt to be parched
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up in dry summers: and their soil being remarkably light, not only from its own nature, but from the practice of burning, is very subject to fall to dust, and to be blown from the roots of grain, especially wheat; by which means the roots are exposed frequently to the frost and drought, and the crops greatly injured or totally lost. Were it not for the ditches, which are generally charged with water, we should see thousands of acres of fen land on fire in a dry summer, whilst fen farmers are attached to the custom of burning. The practice of sowing cole-seed is the only tolerable good husbandry in the fens; to which the treading is so essential, by feeding it of the land. If paring and burning were laid aside,

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this vegetable might be produced by a similar cultivation to that of turnips upon high land. Until this mode of management is altered, lime used, and a system of husbandry like to that upon high land put in practice, the fens must decline in value.

However strange it may appear, it is true, that nothing can restore the powers of the land, but the methods I have pointed out; or its being submersed in water again for two or three years, which for the sake of the owners and occupiers, I hope never will be the case. Where a gentleman is possessed of property in the fens, and the same in a high country, not far distant, affording lime stones, the whole of

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which communicating with each other, and with a good market to purchase coals by a navigable river, the improvement with lime may easily be brought about. It would be worth a gentleman's while to make the experiment, and to allow his tenants lime delivered upon the fen estate at prime cost.

I cannot take leave of this subject without observing, that large tracts of the fen countries might be made of considerable value, and great advantages might be gained by planting aquatic woods, such as alder, black poplars and willows of various kinds, in places which at this time yield very little or no profit. I coincide
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with the ingenious Mr. KENT in his Hints to Gentlemen of Landed property respecting the cultivation and management of timber, and hope to see his plan universally adopted, being well convinced it would tend to the general good of this country.

F I N I S.



